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THE AMERICAN GAS LIGHT JOURNAL

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MR. WARNER'S MECHANICAL STOKER.

In speaking of stoking by machinery, in our last issue, we omitted any mention of the method recently invented by Mr. Warner, of South Shields, England. A full description of this machine has just reached us, and in another column will be found Mr. Warner's own remarks on the machine, made before the North of England Gas Managers' Association.

GAS SUFFOCATION.

In another column is a very interesting account of the personal feelings and experience of one under the influence of an excess of illuminating gas. The remedy applied by "Pat" is an old one, and no doubt has often been applied by many of our readers who have had men overcome while making repairs and connections.

It is a question, however, if the remedy would be sufficient in case the gas was what is known as water gas, or in the case of any gas containing an equally large proportion of carbonic oxide.

The action of carbonic oxide is to destroy the action of the blood corpuscles of the lungs, so that the oxygen of the air is not properly absorbed by them, and hence blood poisoning results. During the past few years there have been a very unusual number of deaths from inhaling illuminating gas, and if the fatality attending these cases should continue, it would seem that the matter ought to be thoroughly and fully investigated. It matters not, in a scientific point of view, whether suicide or accident is the explanation as to the motive; but it is a little singular that in none of the dozen or more cases that have occurred in this city within the past few years has there been any full and exhaustive examination into the *real* facts of the cases that have occurred.

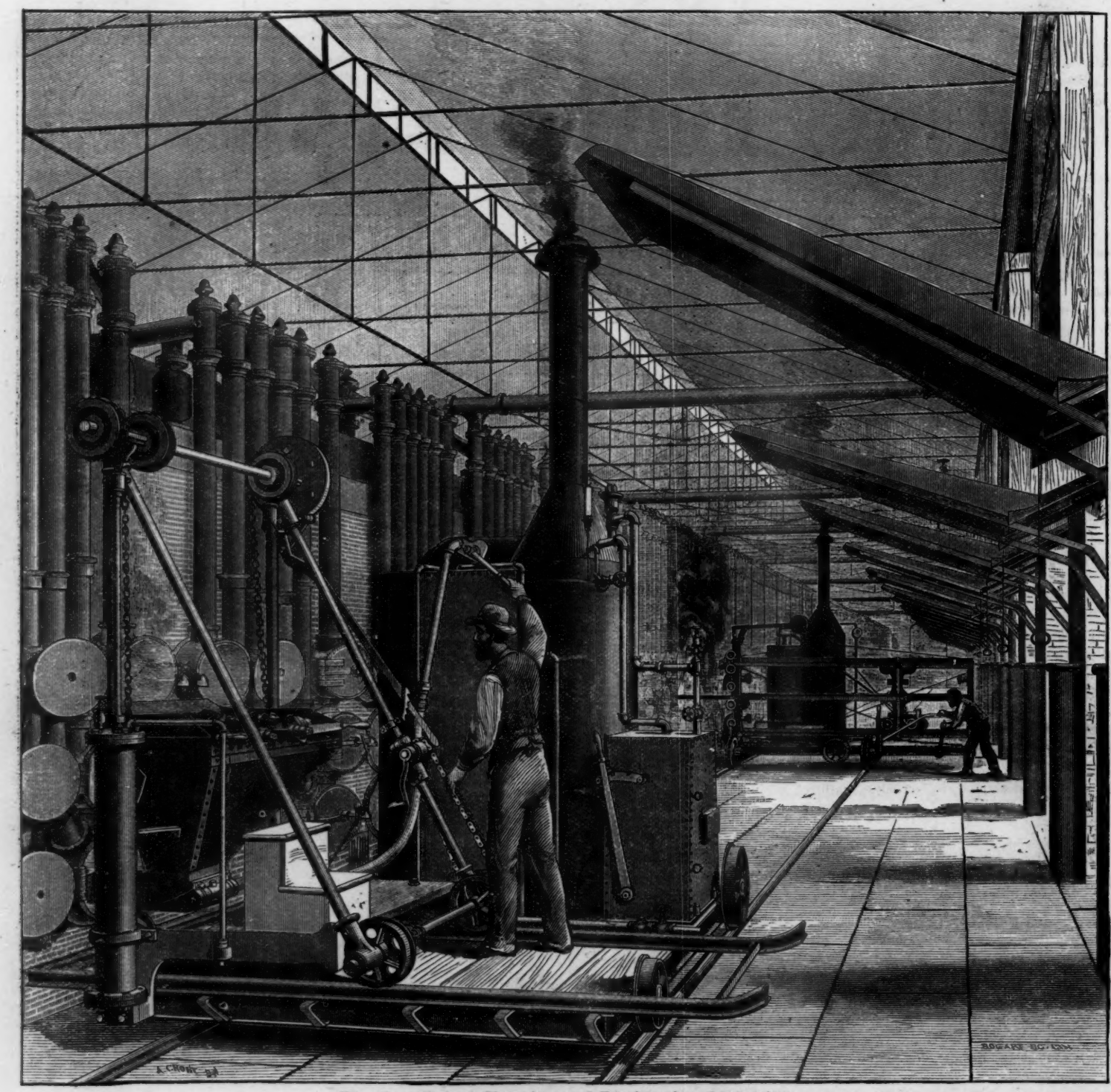
The coroner is usually satisfied with discovering a cause for the death, and the usual verdict is "suffocation by illuminating gas." It would be a matter of importance to know, first, what kind of gas it was that was supplied in the apartment where the accident occurred. Then if it were found that it was as usual where coal gas is used as where any other kind of gas is furnished, the next point to be carefully studied would be the determination of the differences, if any, in the effects upon the various patients where the different gases had been the cause of the disaster.

It is undoubtedly a fact that some constitutions are more easily affected than others; but the real point to be determined is what is the effect in each case where death has ensued.

If the point made by our correspondent, that people are not always dead when they seem so, is well taken, the most important thing is to know what remedy to apply. Whiskey is often used with men who have been overcome in the making of connections where coal gas is used, and although they have been "knocked over" by the gas, they "come to" again, and in a short time go to work. Whether this is equally true with any other gas is a question; but we do not remember to have seen but very few accounts of death resulting from inhaling ordinary coal gas. If this is equally true of the more recent inventions known as water gas, it ought to be known clearly and beyond question.

If, as many of the advocates of water gas claim, it is true that there is no more danger in one gas than another, the sooner this is demonstrated by a careful scientific investigation, the better it will be for the water gas, as it will remove one of the great objections urged against it. It is true, as has been asserted, that the number of people killed is so extremely small, as compared with the total number of persons using illuminating gas, that the total loss is an exceedingly small fraction; but the records of the daily press go to show that this fraction is an increasing one, and the argument reminds one of the reply of the General of Artillery on a certain occasion, which was as follows:

"A battle is not decided by the number of people you kill exactly; but it is by the number who are not killed, but whom you frighten so that they run."



The Ross Retort Charging and Discharging Apparatus.

The accompanying engraving, taken from a photograph, represents a portion of the interior of the Cincinnati Gas Company's Works, showing their machines for charging and discharging retorts in operation.

These machines, which have proved thoroughly successful, and have now been in continuous operation, night and day, for the past six months, are the invention of Abbott Q. Ross, of Cincinnati, and are secured by letters patent in the United States, and numerous patents in England, France, Germany, Belgium, and Canada, all owned and controlled by the United States Steam Stoking Company, whose principal office is located at Cincinnati, Ohio.

The charging apparatus, represented in the foreground in the cut, consists essentially of a carriage travelling on a track laid in front of, and parallel to, the benches of retorts, on which carriage are mounted a steam generator, with supply tank, a steam pressure reservoir, a hopper for the coal, and mechanism for elevating and depressing the hopper and for propelling the carriage.

The hopper which is mounted, with its elevating mechanism, on a secondary carriage, by which it is moved to and from the retorts, is divided into three compartments, each containing a sufficient charge of coal for one retort, these divisions communicating alternately with a conduit below, whence the coal is blown into the retorts by successive openings of the valve in the connecting pipe between the conduit and reservoir.

The attendant is shown in the act of operating the valve to charge a retort. The steam is discharged behind and against the coal in the conduit, through a series of jet-nozzles horizontally disposed, by four quick-openings of the valve, graduated so that the first blast will project the coal to the rear of the retort, and the succeeding blasts deposit their charges uniformly in front of it. The skill necessary for this operation is very readily acquired by any ordinary workman.

Having charged the retort the hopper is moved back a few inches by hand by means of the windlass and chain connection shown, and the main carriage moved aside by its steam propelling mechanism far enough to allow the retort to be closed.

While the lid of the retort is being adjusted steam is admitted to the vertical cylinder shown on the left, and the hopper elevated to the level of the next retort, and held in position by the brake shown on the right and the communication opened in the hopper between the next coal compartment and the conduit. The machine is then run to its former position, the sec-

ondary carriage moved forward to bring the mouth of the conduit into the open retort, which is then charged in the same manner as before, and so on until the three retorts, constituting one-half of the bench, are charged. The time consumed in charging each retort is only six seconds from the adjustment of the conduit to the mouth of the retort until the whole charge is deposited. *The same-sized coal is used as in hand-charging.*

After charging three retorts the hopper is lowered, drawn back upon its supplemental carriage to its limit of travel, and refilled from the coal chutes above. This process is repeated throughout the entire series of retorts.

The discharging apparatus, which is shown in the background of the cut, moves in advance of the charging machine in its general operations. It also consists of a steam carriage, propelled upon the same track, supporting a steam generator, propelling mechanism, water tank, a system of rakes adapted to the relative heighths of the retorts, a reciprocating traveler for actuating the rakes, moved by steam power upon guides arranged one above the other transversely across the carriage, and a governor for regulating the movements of the rakes.

The reciprocating movement of the rakes is accomplished by a horizontal steam cylinder in rear of, and parallel to, the guides operating a rack bar engaging a spur-pinion upon a shaft secured beneath the carriage frame, and a chain-wheel upon the pinion shaft, to which chains are attached, passing over grooved pulleys and connected with the reciprocating traveller on opposite sides. The rakes are connected with the traveler by removable pins, which may be withdrawn, and the rake handle secured in a state of rest to the vertical rear brace supporting the guides without interfering with the movement of the traveler.

The rake beams (which are flat bars of iron about 12 feet long) move and are guided upon grooved supporting rollers, secured to a vertically adjustable bar moving in guides upon the forward brace which supports the traveler guides. This adjustable bar is counterbalanced by the weighted lever shown above; and its vertical movement is controlled by a horizontally disposed lever within reach of the attendant in rear.

By the construction of the mechanism three rakes could be operated together to discharge three retorts arranged in a vertical plane; but in practice but one rake is used at a time, by which the overheating of the rakes is avoided, as each is in use but one-third of the time. The rake head is made to conform to the size and shape of the retort, and is hinged to its beam by a "rule-joint" connection, which permits it to pass horizontally over the contents of the retort in entering, but assumes a vertical position when being drawn back. The rake is guided with absolute certainty by the mechanism before described, as occasion requires, and every movement which could be imparted to it by hand is given by the means referred to with even greater precision.

The speed and movement of the traveler and rakes are controlled with perfect certainty and precision by the governor before mentioned, which consists of a supplemental cylinder in the line of the steam cylinder into which the piston rod is extended, carrying a solid piston. A pipe connects the two ends of the supplemental cylinder, through which water or other liquids displaced by the piston from one end of the supplemental cylinder is conveyed over to the other end. The maximum speed of the traveler is regulated by a globe valve located in this pipe, controlling the discharge area, while an oscillating valve, also in this pipe, actuated by the piston rod, controls the speed of the traveler at different portions of the stroke, and serves also to cushion the impact at the end of each reciprocation. In the cut the attendant is shown in the act of operating the machine—the central rake being attached to the traveller, and the upper and lower ones stationary. He is shown with his left hand upon the lever controlling the movement of the reciprocating traveler, and his right controlling the elevation and depression of the rake.

For the successful and beneficial use of the discharging apparatus no further preparations or changes in the existing plant are necessary than to lay a track. For the charging apparatus it is desirable to provide for the delivery of the coal to the charger by chutes, either at one end of the line or at intervals. One operator only is required for each machine.

The general dimensions of the apparatus are as follows:

CHARGER.

Main carriage platform, 9 × 10 feet; height to top of chimney, 14 feet; weight, 7,000 lbs.

DISCHARGER.

Length, 14 feet; width, 8 feet; height to top of chimney, 14 feet; weight, 9,000 lbs.

These dimensions may be decreased to a limited extent. For small works the two machines may be united in one, but one operator being required for the combined machine. The guaranteed capacity of these machines, either separately or together, conditioned upon a suitable provision for delivering coal to the charger, is one retort per minute while in operation. Suitable intervals must be allowed for rest of operator and ordinary attention to the machinery.

The success attending the introduction and use of these machines is due no less to the perfect manner in which the desired results are accomplished, than to the extreme simplicity, durability and cheapness of the machinery employed. But in addition to the great saving in labor, both in charging and discharging retorts, over the hand process, the economy resulting from the almost instantaneous deposit of the charges, and the consequent prevention of the usual wastage of the richest portion of the distillation from the charge will be apparent to every gas manager.

For all further information, address the United States Steam Stoking Company, at Cincinnati, Ohio, U.S.A. Managers of gas works and gas engineers desiring to witness the practical operation of these machines may do so at the works of the Cincinnati Gas Company.

The Effect of Electric Light upon the Eyes.

A Russian correspondent of the Paris *Temps* speaks as follows as regards this matter:

"Kronstadt was the first city in Russia where the electric light was introduced into public and private buildings, and it has also been the first to discover its inconveniences. Diseases of the eyes having become more frequent, the attention of the government and of occulists has been turned towards the means of preventing these sad effects. The officer commanding the Black Sea fleet has reported several cases of the sudden loss of sight caused by the dazzling of these lights used on board, and having an illuminating power of 14,000 candles.

Doctor Lubinski, a specialist and an authority in these matters, has investigated this question, and finds that the use of blue glasses is the best protection against the Jablochkoff light. Next to this comes the gray glasses, and then the violet. Clear yellow tints, and also red, should be carefully avoided, for instead of decreasing the ill effects of the electric light upon the eye, these colors render it more injurious.—*Jour. des Usines a Gaz.*

Kerosene Oil Casualties.

Sarah Buckley, a matron of forty-one years, living at No. 271 Third street, Williamsburgh, thoughtlessly poured kerosene oil upon a smoldering fire yesterday, and was fatally burned.

While Miss Ida Tompkins was lighting a kerosene oil lamp at Sing Sing last evening it exploded, and she was seriously burned on her left side and other portions of her body. Her mother and sister threw a blanket over her and extinguished the flames. The house was also damaged by fire.

A kerosene lamp exploded at No. 209 East Twenty-sixth street and caused a fire by which a woman and child were burned, the woman seriously. The damage to property was slight.

A fire from a similar cause broke out on the top floor of the tenement house No. 171 Elizabeth street, occupied by Elizabeth Teters. The damage amounted to $250.—*New York Herald*, Friday, May 28.

Gas and Water Items.

Catskill, New York, is talking of water works.

The mains of the Winona, Minn., water service are to be extended.

The new water-works of Denver, Colorado, are in perfect working order.

The distributing system of the Toronto, Canada, gas works is being extended.

The Peoples Gas Light Company of Elgin, Ill., intend erecting works this season.

It is stated that a system of steam pumping machinery could be erected at St. Paul, Minn., for about the proposed expenditure for cisterns.

On the 4th inst. the people of St. Gabriel, Canada, voted in favor of a comprehensive water supply system. The estimated cost is $65,000.

As a result of building water works at Henderson, Ky., the cost of insurance in that town has decreased from $52,000 in 1873 to $30,000 in 1878.

It is said that the Water Works Commissioners of Watertown, N. Y., will soon build a dam, a bulkhead and pump house above the city, where the best water is to be found.

The Lewiston Water Power Company is building a tremendous dam at the foot of Richardson Lake, Maine. It will be 500 feet long, 20 feet high, with 13 gates, and will make a lake with an area of 40 square miles.

The Chamberlain, Troy, New York, announces that he is now ready to pay the last of the Troy water-works bonds issued in 1835, and signed by George M. Tibbits, Mayor. They amount to $20,000 and were due on the 1st of May.

The Committee of 15 citizens chosen in special town meeting, some time since, in Marlboro, Mass., have voted unanimously to recommend the town to introduce water, at an expense not exceeding $100,000. For the consideration of the matter a special town meeting will be held.—*Engineering News.*

[From London "Journal of Gas Lighting."]

North of England Gas Managers' Association.

The Sixth Half-Yearly General Meeting of this Association was held at Newcastle-on-Tyne on Saturday, April 24. Mr. W. Ford of Stockton-on-Tees the President of the Association, occupied the chair.

The Secretary (Mr. W. Hardie) having read the notice calling the meeting, the minutes of the previous meeting, which had been printed and circulated, were taken as read, and confirmed; and the accounts of the Association, which showed—after investing £139 in Newcastle and Gateshead Gas Company's stock—a balance of £43 7s. 3. in the hands of the Treasurer, were adopted.

Some discussion took place in reference to the days fixed in the rules for meetings.

Mr. Warner moved that the meetings of the Association be held in the last week of April and the first week of October in each year, but that the particular days of such meetings be left to be settled by the committee.

On a division being taken, Mr. Warner's motion was carried.

Mr. Warner then referred to the great assistance he received last year, when President of the British Association of Gas Managers, from the President and Secretary of the North of England Association, to whose exertions, he said, the success of the Newcastle meeting was in no small degree due, and he took this, the first opportunity of thanking them.

The President acknowledged the compliment on behalf of himself and the Secretary. He then referred to the death of Mr. Irvine, the Manager of the Ripon City Gas Works—a member of the Association. Mr. Irvine, he said, also had charge of the water works, but unfortunately his health failed. He had great experience as a practical engineer, and was highly esteemed by all who knew him. He (the President) further stated that before he left the chair he had a pleasing duty to perform—namely, to present Mr. Wm. Hardie, Jr., with Miller's "Elements of Chemistry," being the prize awarded to him for the best paper read at their meeting last April. When he read the paper Mr. Hardie was an assistant at the Newcastle Gas Works, but since that time he had been appointed to the management of the Tynemouth Gas Works. He was sure all the members of the Association wished Mr. Hardie success and prosperity in his new undertaking.

Mr. Hardie, Jr., briefly returned thanks.

The Chairman announced the result of the voting for officers for next year as follows:

President—Mr. J. H. Cox.
Vice-President—Mr. T. Trewhitt.
Committee—Messrs. J. Hepworth, C. Sellers, W. Smith, and S. Studholme.
Auditor—Mr. J. H. Penney.
Secretary—Mr. W. Hardie.

On the motion of Mr. Hepworth, seconded by Mr. Trewhitt, a vote of thanks was passed by acclamation to Mr. Ford for his services as President during the past year.

It was unanimously resolved that the October meeting be held in Sunderland.

This concluded the ordinary business of the meeting.

The Members and Associates then proceeded by rail to Jarrow, on a visit to the South Shields Company's new works. They were met by Mr. Henderson, Mr. Robinson, and Dr. Armstrong, Directors; Mr. Warner, Engineer; and Mr. Penney, Secretary of the Company, and conducted over the works. The new stoking apparatus invented by Mr. Warner was set to work, and all present had ample opportunities of inspecting it, even to its minutest details. After having surveyed the other portion of the works, the company were invited to the purifying house, where Mr. Warner gave the following explanation of his invention:

Before describing the machinery, I invite you to a brief consideration of the work of the retort house, and to the modifying influence of machinery upon that work. By thus dealing with the matter we may be better prepared to judge of the fitness of the several arrangements for the work, and to examine whether they are adaptable to the varying requirements of different coal, make, and retort houses.

The work usually carried on in an ordinary retort house may be said to be included in drawing and charging, all of the operations being intermixed. Thus, the retort is drawn, then left for the removal of the coke; the charge is then prepared, and the retort is returned to for charging—the whole being only several portions of one operation. With stage floors we find, of necessity, a more systematic course of working. As the coke is drawn it falls to the vaults beneath; hence the removal of the coke does not interfere with the other operation, and as the charges are more or less prepared, we find the whole work thus divided into three operations. The more these are separated the more systematic and economical will be the work of the present mode of carbonizing.

To the system of carbonizing I have given considerable thought. Years since I submitted to the Directors of the South Shields Gas Company a plan which would have entirely changed the character of our operations. Many other schemes, more or less complete, I have devised, but I have found my way back to the old plan of horizontal retorts, good heats, fair charges, and of the ordinary duration. The retorts I use—18-in. curcular—are nearly the same in dimensions, and I may say are quite the same setting as those I have had in use at Shields for the past 16 years. With these retorts Mr. Carr, the Superintendent at Shields, has been getting from 5000 to nearly 6000 cubic feet of gas per mouthpiece through the winter, 50 per cent., too, of the settings being single. I need scarcely say that this was with 6-hour charges. Probably I should not have mentioned this, but upon a visit being paid to these works a short time ago, by an engineer of very large experience, exception was taken to the employment of circular retorts.

As the tools I use for drawing and charging are but the rake and scoop, they can work any ordinary form of retort; therefore in my case the matter simply resolves itself into a comparison of the machinery with the ordinary labor. Indeed, in every case of investigation of this character I think this course should be adopted—the carbonizing separated from the manipulation, unless a new principle is introduced, in which one is an essential portion of the other. The machinery for charging and drawing must be considered and judged upon its own merits, as must also the form, size, and proportion of retorts, the weight of the charge, and its duration; and all these matters can and should be kept free from any other influence affecting the quantity or quality of the gas.

As the ordinary settings, or number of retorts in a bed, are limited to the height of a man, the arrangements that have been made for increasing the power of the bed by adding to its height have, of necessity, been of a limited character. In this respect, and probably in this more than in any other way, the introduction of machinery into the retort house will exercise a considerable modifying influence upon the working. Comparisons must often be made, and not to our credit, perhaps, by those not familiar with our operations, between the height of our buildings and those of other manufactures. Doubtless the contrast is very striking, and I have no doubt a change will be brought about. Indeed, I purpose working in this direction. Considerable advantage will arise from this alteration of plant, as well as economy of working, and it will materially affect the comparative cost of machinery. For example, if the cost of machinery for working a bed of sixes is £20 per mouthpiece, a bed of twelves would be reduced, the machinery being the same, to £10 per mouthpiece. I need scarcely add that, in moderate-sized works, a modification of the chambers and flues of the settings would be necessary in most cases if such powerful beds were in action; and perhaps in beds of considerably less power such arrangements might be made with advantage, and dampers used to our profit and convenience.

But, of course, in this departure from our present practice, relative proportions would have to be observed, as they are in the present settings. I am not recommending any particular number of mouthpieces to a bed, but simply indicating what I think will be one at least of the modifying effects of the introduction of machinery into the retort house.

Again, I look for a considerable alteration of the working of moderate sized or comparatively small houses. With machinery, the labor will remain constant both summer and winter in each house, the minimum of labor being sufficient with the machinery for the maximum make. Another modification will be hastened on by this question of machinery—I allude to the gas furnace, as it will simplify the operations of heating, getting rid of the firing, and cleaning of the furnace. But this work may be done with advantage by the machinery, and I am making arrangements to do it.

To return to the working, we have, then, three distinct operations—systematic preparation of the charges, drawing and charging, and delivering of coke. Let us consider them in their order:

First, the preparation of the charge. Assuming the coal to be that of our locality, and unscreened, it will be necessary to break the large pieces, and then to fill the scoop, or charge the retort direct. In the latter case the operation of charging seems to be involved in that of preparation, and less comparable with machine work. In the former we fill the scoop with suitable coals, and the work is complete. In attempting this work by machinery, it will be found that not only has the coal to be broken and put into the scoop, but the machinery must be made adaptable to work a changing quantity of coal. The man with a shovel naturally adapts himself to the varying quantity, and so the machinery must act alike upon any quantity of coal. The plan which I hove adopted is to draw the coal out from the bottom of the bunkers into a scoop or its substitute. The machine, consists of a revolving shaft, with arms radiating from it, works out the coal, breaking the large pieces at the same time. With this arrangement it is thought, from an experiment made the other day, that a ton per minute can be put into charges.

Secondly, charging and drawing by hand—this operation may be said to commence with the lifting of the scoop. With the machinery I prefer to

consider the raising of the scoop a part of the work of preparing the charge. It is done by a simple crane and lift, and the charge is left suspended in front, and just above the retorts to be charged. I say retorts, as the scoop substitute carries two charges of coal. It will be seen that by the use of these cranes there is an entire control over the retort, and the height of the retort from the floor is not limited: also, there is absolutely a free course for the machine along the house, under the suspended charges. Thus the work is reduced to the lowest possible amount—the thrusting of the scoop into the retort. In lifting the scoop by hand, it is thrown on the mouthpiece. With the machine it slides along the cradle supporting it into the retort. The scoop thus being free to adapt itself, there can be no prejudicial action, to say the least, upon the retort. Those that you will see in action have already had a season's work. In drawing, the action is nearly the same as by hand. A rake is used, being pushed over the coke, worked into it, and the charge drawn. By hand there is no action upon the retort, the rake being free; so with the machine. By hand there is an elasticity in the operation of the tools—the scoop and rake—that is conducive to the preservation of the retorts; this elasticity, and also a freedom from shocks and violent strains, should be found in all arrangements of machinery for doing such work. In the machine you will see here you will find, I hope, these qualities to a noticeable extent.

Thirdly, the delivery of the coke. As done by hand, it is wheeled out into the yard, and deposited; but other labor is required beyond this. A portion at least of the coke has to be shovelled into the barrows, and all of it has to be more or less trimmed and stacked; or, if with stage working, it has to be filled into waggons from the vault floor. Here, then, for machinery to do the whole of the work required, the coke must be removed from the house and lifted and stacked over a large portion of space—indeed, the entire coke yard. This I do by extending the coal cranes through the sides of the house into the yard. On a previous occasion I alluded to the value of time in such cases being very marked. Fixing the charging and drawing at a standard of a minute per mouthpiece, with a constant succession of work, every six or seven minutes gain or loss during the hour means a bed more or less per hour. It is therefore obvious that each operation should be timed to the others; that is to say, these operations should take a minute when worked at the quickest. With the arrangement here I have no doubt this will be regularly done. We can take the retorts at a minute per mouthpiece, and the charge of 2¼ cwt. can be completed in about 12 seconds.

Mr. Warner's statement was received with much applause.

The members afterward dined together at the Railway Hotel—the chair being occupied by Mr. W. Ford. In addition to those already named the Mayor of Jarrow (Alderman Huntley) was present, and sat on the right of the Chairman.

After partaking of an excellent dinner,

The Chairman gave the usual loyal and patriotic toasts.

Mr. J. Pattinson, of Newcastle, proposed the health of the Mayor and Corporation of Jarrow, and in doing so referred to the important duties they had to perform in looking after the comfort and health of the inhabitants.

The Mayor of Jarrow responded, and remarked that it was very fitting that he, as connected with the corporation of Jarrow, should take part in such a gathering, for while those present, as gas managers, were directing their attention to the improvement in the manufacture of a great essential in civilized life—namely, light—the body of which he was a member were, as a Corporation, giving their best attention to promoting the health of the people; and while much had already been done in this direction, much, there was no doubt, remained to be done. As a Corporation, they were endeavoring, by enforcing sanitary measures, to stem disease and reduce the rate of death.

Mr. Sellers, of York, said the next toast was one which he felt assured would be cordially received by every gentleman present. He had to ask them to drink to the health of the Directors of the South Shields Gas Company. They possessed many good qualities, first and foremost among which was their hospitality; for, as would be remembered by many present, about six weeks ago, when the Engineer, Mr. Warner, invited the gas managers to witness the working of his patent retort-charging apparatus, they most hospitably entertained them. In addition to the quality he had named, the Directors of the South Shields Gas Company were a very enterprising body of gentlemen; and not only so, but were also highly intelligent, and they had well displayed their intelligence by selecting Mr. Warner as their Chief Engineer and Officer. Their friend Mr. Warner had by his ability placed himself in the front in the gas world. They all admired his enthusiasm, his ability, and his industry; and he (Mr. Sellers) was sure the Directors of the South Shields Gas Company could not be served by a better officer than Mr. Warner. The Directors had shown their enterprise by indorsing and carrying out that gentleman's invention. It was very creditable to a small company to have taken up the invention in the manner they had, and he was glad to have to acknowledge the enterprise, pluck, and courage of the Directors of the South Shields Gas Company. It had been said that the man who made two blades of grass grow where only one grew before was a greater benefactor to humanity than he who won a battle; and he believed that the next in importance to such a man was he who invented machinery to lessen human labor; and he could only hope that the invention of Mr. Warner would be crowned with success, and be generally adopted. If so, the name of Mr. Warner and the South Shields Gas Company would be handed down in the gas world for generations to come.

Mr. J. Henderson, of South Shields, in responding, referred at the outset to the remarks of Mr. Sellers in regard to the South Shields Gas Company being a small company, and observed that they did not exactly look upon themselves as a small company, though they were very much inclined to the opinion that they compare favorably in size with Newcastle and Sunderland, although they supplied not only two burrows—South Shields and Jarrow—but also the Local Board of Hepburn, together with a large area in a rural district. He was sorry that the Chairman (Mr. R. Wallis) was not present with them that day; but in his absence he had, on behalf of himself and his colleagues, to return thanks for the cordial manner in which the toast had been received. He could assure them that the Directors were anxious to forward any improvement in the way of gas making, so far as they possibly could; and the compliment they had paid Mr. Warner had not been undeserved, for by his energy, ability, and perseverance he had raised himself to a high position in the gas world. He (Mr. Henderson) then proposed "Success to the North of England Gas Managers Association." Although this was, he said, the first time he had had the pleasure of meeting the members of the Association, he hoped it would not be the last. He might remark that during the past four or five years they had had a great deal to contend with in the way—to give one instance, of the electric light—but he had no doubt that if these gentlemen, the gas engineers, would only still put their shoulders to the wheel, they would, so far as the supply of gas was concerned, be able to compete with it. In his opinion the electric light did not occupy the same position that it did some months ago, and although it might be useful for the lighting of public squares and large buildings, he did not think it would interfere with the lighting of shops and private dwellings. With reference to the invention of Mr. Warner, in addition to the saving of manual labor, it had also a humanizing effect, doing away with the most laborious work, and there was no doubt it would in time be generally adopted by gas companies. The great object, however, of the invention and of the inventor was to endeavor to make the manufacture of gas as cheap as it possibly could be made.

Mr. Cox, of Sunderland, in responding, referred to the usefulness of the Association.

Mr. Hepworth, of Carlisle, gave "The health of Mr. W. J. Warner, the Engineer to the South Shields Gas Company." Mr. Warner, he said, by his ability had fought his way into the front ranks of the gas engineering world, and had not only occupied the chair of this Association, but also that of the British Association of Gas Managers. Mr. Warner was well deserving of the position he had attained, and they admired him not only for the good qualities of his heart, but also for his inventive genius.

Mr. W. J. Warner, on rising to respond, was received with hearty applause. He said there was often a great distance between a person's desires and his attainments, and for himself he felt that his work ought to have been greater than it had been, and that he ought to have advanced the profession with which he was so closely identified somewhat more than he had done. He was afraid his friends saw in him many good qualities to which he could lay no claim. He, however, might say that from his youth he had endeavored to obtain a practical knowledge of his profession, and to extend that knowledge as far as in him lay; and he might remind them that when he was a young man there was scarcely a professional paper to be had. The *Journal of Gas Lighting* only appeared once a month, and was of limited size. Now a great change had taken place in this direction, and valuable papers were published in it with great frequency. It had been his desire to strike out some method of bringing gas people more closely together, and he consulted his friend, Mr. T. G. Barlow, the then proprietor and editor of the *Journal*, and in a letter which he (Mr. Warner) wrote, suggestions were made regarding the formation of a gas managers association. These were subsequently acted upon, and associations were now found in almost every part, not only of this country, but also abroad. These associations were the means of doing much good, and by mutual consultation the members were able to arrive at something beneficial. They had been enabled to secure a considerable amount of economy in the carrying on of their works, especially in regard to unaccounted-for gas; for what was formerly 30 per cent. had now come down to 5, 6, 7, 8, or at most 10 per cent. This was one of the causes of their success. He thanked them sincerely for the enthusiasm with which they had received the toast.

The Mayor of Jarrow gave "The Health of the President of the Association," which was received with applause.

The President acknowledged the compliment, and in referring to the invention of Mr. Warner in the way of saving labor, said he hoped that gentleman's inventive genius would be further exerted so that additional advancement would be made in this direction. By so doing it would tend to still further reduce the price of gas, and to extend the advantages of light into every dwelling. The President then proposed "The Health of Mr. Hardie, the Honorary Secretary," who had been most indefatigable in his efforts on behalf of the Association.

Mr. Hardie responded, and said it had always been a pleasure to him to do what he could to help on the Association. Speaking of the meeting held in Newcastle, he said it was gratifying to note how cordially they were aided by the local companies, as well as by many gentlemen connected with the gas industry in the district.

Mr. Henderson then gave the health of Mr. John Pattinson, Analytical Chemist, who was well known in the North of England, not only as a scientific gentleman, but more particularly as regarded chemistry. Mr. Pattinson was connected with every gas company on Tyneside, and although he (Mr. Henderson) did not know what his friend Mr. Warner would say, he could only remark that the monthly visits of Mr. Pattinson were a very great relief to the directors.

Mr. Pattinson, in responding, said he had invariably found both managers and directors of gas companies extremely anxious to give the very best article they possibly could. With respect to sulphur, with which they had to contend, he thought he might say that it was almost conquered. They had recently some experience in this direction at South Shields, where the sulphur suddenly rose to an alarming extent; but he was very glad it did occur at South Shields, because he knew they had there a very excellent engineer, and the result was that through Mr. Warner's efforts it was brought down far below the standard allowed by act of Parliament. Mr. Warner not only knew how it was done. but he could do it again, and also teach others to do a similar thing. With regard to the illuminating power of the gas, it had always been their desire to keep it up, and very rarely indeed had he to report that the gas was below the standard required by the act of Parliament.

Other toasts followed and the proceedings concluded.

English Coals in France.

A special correspondent of the *Leeds Mercury*, writing from Paris, says:

The duty at present existing on English coal entering France under the treaty of 1860 is 1f. 20c. per ton, which is equal to about 11½d. per ton. This is not in itself a very prohibitory duty, but when added to the cost of freight, carriage, and insurance, it none the less adds to the ultimate increase in the cost of British as compared to French coal; and as coal is so important an item to productive industries, being, in fact, raw material to all, an energetic effort might perhaps obtain the reduction of this duty, at all events to the "round figure" of, say, 1f. per ton. I think English importers might agitate for that amount with a fair chance of success. The Tariff Committee advise the increase of the 1f. 20c. to 1f. 30c., for the general tariff, but it is thoroughly understood by those who are conversant with French habits in these circumstances, that this increase is only suggested so as to insure the maintenance, and to preclude the possible reduction, of the 1f. 20c. rate to Powers negotiating treaties. The great argument of the committee for any duty at all in the first place, and for the increase of the old duty in the second place, on an article of such paramount national importance as coal, is the natural or geological inferiority of France in coal bearing strata.

Compared with England and Germany, or even Belgium, France is certainly poor, both in the extent and in the thickness of her carboniferous veins. This, however, from the point of international competition, is a reason for the abolition, and not for the imposition—still less the increase—of a duty. Other arguments against any duty at all may be gathered from the present state of the French coal trade. In 1878 there existed in France 629 "concessions," or government authorizations, to extract combustible minerals; of these about one-half only—viz., 357—were at work. The indiginous production of coal was—

In 1825	1,500,000 tons.
1860	8,000,000 "
1870	13,000,000 "
1876	17,101,448 "
1878	16,960,916 "

So that since the treaty the production has more than doubled, showing that the 1f. 20c. duty is more than is necessary to produce a profit. The number of miners employed in the extraction of coal has also increased most satisfactorily since 1860, the figures being—

In 1833	15,400 men.
1862	69,300 "
1869	84,500 "
1875	108,700 "
1878	106,400 "

The average wages these men received are estimated at £42 per head per annum for 1875, and at £39 for 1878. Four-fifths of the total coal production of France are extracted from six districts, which are, in order of importance, those of Valenciennes (comprising the departments of the Nord and the Pas de Calais), Loire, Alais, Creuzot and Blanzy, Commentry, and lastly Aubin. The final fifth is derived from no less than 41 distinct small districts.

The consumption of coal by France averages 24 million tons per annum, of which two-thirds are produced within the country, and one-third only imported. Of this latter third—say eight million tons—four are imported from Belgium, two and a half to three millions from England, and one million from Germany, including the old French coal-fields of the East. This foreign coal is estimated by the committee to "invade" 61 departments, and to predominate in 33, not including Algeria; but the truth of the matter, I believe, is that English, Scotch, and Welch coal penetrates principally within the triangle which would be formed by a line drawn west of Havre to Paris and north from Paris to Calais. Beyond this limit the cost of carriage, etc., precludes competition with the native, though inferior coal, except perhaps at the coaling ports. Yorkshire coal, from all I can learn, might, with a little energy, open new fields of enterprise, both in Paris itself for household purposes, and outside the town limits in the mills and workshops, as also in the various industrial centres which flourish on the banks of the Seine from Paris to Havre.

The various causes of inferiority quoted by the committee as reasons for the imposition of a protective duty on foreign coal are really domestic, calling for home and individual reform, rather than for a national premium on native coal mining. These disadvantages are, firstly, the natural or geological paucity of coal; secondly, the special taxation on mining concessions (amounting to the estimated sum of nearly £100,000 for 1880); thirdly, the want of carriage facilities by water; and fourthly, the high rates of railway carriage, which are, it is stated, especially disproportionate to the low through rates accorded to coal arriving from abroad. Wages, it is also stated, are higher in France than in foreign mines; but the committee have affirmed this so often in the instances of other trades where the truth is notoriously in the contrary direction, that in the present case we may legitmately remain unconvinced. The individual production of combustible per miner is asserted to be less than abroad, and if the asserted meagreness of strata be correct this assumption is perhaps better founded. From 1876 to 1878 the average production per miner is estimated at between 154 and 159 tons per annum; whilst the Belgium workman is credited with 180 tons, the Prussian miner with 200 tons a year, and the British miner with no less than 333 tons per head. Practical mineowners and managers must criticize these assertions, and when the time comes enable our negotiators to contradict them if incorrect or exaggerated. The general cost of mining in this country is placed on a higher basis owing to these "natural" causes, the "Coal Committee of the North of France," a rich and influential body, estimating the cost of production of coal at 5s. 2¾d. per ton in England, and at 8s. 9¾d. per ton in French mines.

But the damning fact against the would-be protectionists in coal is the almost unheard-of prosperity of the leading coal owners, and the extraordinary prices at which the shares of the principal mines are quoted. I will close my remarks upon this combustible with an extract from to-day's share lists, which is in itself so eloquent that any comment of mine would decrease its overwhelming arguments:

Name of mine.	Amount paid up per share.	To-day's value per share.
Anzin	500 francs.	6,000 francs.
Grand Combe	1,000 "	2,500 "
Dourges	1,000 "	8,500 "
Bruay	400 "	9,650 "
Aniche	500 "	15,500 "
Vicogne-Vieux	1,000 "	20,100 "
Lens	1,000 "	24,900 "
Courrieres	300 "	27,000 "

—*The Gas Engineer.*

BLEW THE GAS OUT.—A man named Mackey, a citizen of Port Richmond, Staten Island, missed the midnight boat last night, and was compelled to seek lodgings in this city. He took a room at No. 49 Whitehall street, and when he went to bed instead of turning off the gas he blew it out. Just before six o'clock this morning he was discovered unconscious. He was removed to the Chambers Street Hospital.—New York *Evening Post*, May 17.

[From the "Review of Gas and Water Engineering."

West of Scotland Association of Gas Managers.

The Eighth Annual Meeting of this Association was held in the Town Hall, Hamilton, on Thursday, April 29—Mr. Robert Mitchell, Coatbridge, President, in the chair.

Mr. Dalziel, Secretary, read the minutes of the previous meeting, which were approved of by the meeting. The business of appointing office bearers was then proceeded with, and Mr. Robert S. Carlow, Port-Glasgow, was elected President.

Mr. R. S. Carlow said—Mr. Chairman and Gentlemen: I have received many kindnesses from the Association, and now that you have conferred upon me the highest honor at your disposal, it is my duty to return thanks. Considering the many able men who have filled the office of President, I feel that you have laid upon my shoulders a burden which it will be hard for me to bear. I thank you for electing me to the office of President, and although I may not perform the duties with that tact and ability which have been exhibited by my predecessors, I will, to the utmost of my power, and to the best of my ability, do what I can to promote the interests of our Association. (Applause.)

Mr. Robert Mitchell, the retiring President, addressed the Association as follows:

I have to thank you, gentlemen, for the great interest you have manifested in the affairs of the Association, and I take this opportunity of expressing to the members of the committee for their attendance at our various meetings, and the encouragement afforded me in the discharge of my duties as you President.

I congratulate you on the selection of my successor, Mr. Carlow. You have in him a gentleman who will reflect credit upon the Association, and I feel confident that whatever is in his power for the futherance of the usefulness of the Association will be carried through with his wonted zeal and indefatigable energy. I again ask your indulgence while I make a few remarks upon the subjects which are more or less interesting to all of us, and in so doing I will endeavor to be as brief as possible, as the programme of business is lengthy, and as there is nothing more hurtful to the author of any paper than the want of sufficient time for the proper discussion of its various points.

Since the electric scare two years ago, every gas engineer has been more than ever diligent in his researches—experimenting, and working some scheme which might be instrumental in cheapening the production of gas, whether in the retort-house or any part of the apparatus, or in the proper combustion of the gas after it is produced. Many deserve the best thanks and encouragement of all of us for their arduous labors. What have been the results of the last two years' experience?

We have reached a point when there is an appearance of a thorough revolution of not a few systems of working, and as the retort house is the most important place in which any change that would have a direct influence on the reduction of first cost in the article produced, we might now reasonably expect this, if we consider the various systems of generation furnaces, mechanical stokers, and other alterations on the hydraulic main, with and without dips, with and without valves—in short, with and without hydraulic mains, that are now in operation.

In passing, I would say a few words with reference to the furnace. Generally speaking, the coke produced from cannel coal, and which forms the larger part of the firing used in Scotch gas works, the quantity of ash ranges from 10 to 20 per cent. The inferiority of the cannel coke is in many instances improved by an admixture of free or heading coal, but the percentage of the fuel consumed for a given quantity of gas produced in many cases bear no resemblance to each other, and instances are to be found were only a small proportion of the make is sold. Economy in fuel being a matter of great importance to every gas manager, careful attention is necessary, so that the admission of air to the furnace should be in proportion to the amount of work required. The quantity of fuel by the present method of heating our ovens (a very considerable portion of the gases produced in the furnace) leaves the settings at a much higher temperature than could be wished.

To the careful building of the retort bench, success in carbonizing in no small degree depends. The material used ought to be well selected, the joints of the brickwork should be as close as possible, and to allow the bricks to take thorough hold they should be dipped in water, so that the moisture in the fire clay will not be absorbed quickly, and no setting ought to be heated up for at least three weeks after completion, which must be by very high firing, so that the moisture may be driven out slowly, and leave the building one homogeneous mass.

The retorts generally used in Scotch gas works are D-shaped and oval. Experience having proved that these are more advantageous for gas manufacture than the round ones which were the favorite for so many years, although the last-mentioned is by far the strongest and most durable. I consider that a D retort 24in.x14in. and 8ft. 6in. long a most serviceable size, set four in one oven, with an oval top 24in. x 15in. x 8ft. 6in. The length stated is only applicable to a works where they work single ovens, owing to the fact that they cannot in the light season have more than, say, two stokers on each shift. In larger works, where the number would never be less than six stokers, three through retorts of like dimensions could be wrought to advantage.

Those of us who are located in the midst of iron industry have many opportunities of witnessing the action of the gas furnace on Siemens' principle. The adoption of this style of gas furnace to a retort bench would in many cases be very expensive, especially where the charging floor was the firing floor, as it would necessitate the entire alteration and reconstruction of the bench. Not so in many of the large works, where the work is carried on with a stage.

Under this condition there is not any real difficulty in the adoption of the Siemens furnace, and I am confident the saving effected in wages, not to speak of the increased amount of work which might reasonably be expected out of the same number of ovens, as compared with our present system, would be very considerable. One argument against the adoption of these furnaces may be that of the increased quantity of coke at the disposal of the gas company. Then we should have to go on the principle of small profits and quick returns.

Another form of generator is that known as Ochelhauser's. This furnace would require but a very slight alteration for its adoption in any of our gas works. It is nothing more nor less than a tapered shaft furnace, with a strong iron grate for a bottom, the bars of which are sufficiently wide for the admission of air, and also allow any slag which may gather beign removed. The air passing through the grate and coming in contact with the incandescent fuel, forms first carbonic anhydride (CO_2), which, after passing upward through the layers of heated fuel, is converted into carbonic oxide (CO), while at the same time some of the fuel is undergoing destructive distillation, thereby causing a certain amount of hydrocarbons to be thrown off into the passing gas. Water or a steam blast might be used under the bars. If water was used it would become vaporized, and, passing through the highly heated fuel, would be decomposed, adding more heating power to the gas formed, carbonic oxide being formed, and free hydrogen.

By careful working of one of these furnaces the desired temperature could be uniformly kept by regulating the propartions of air at the ports. The intensity of the flame could be varied with as great ease as an ordinary blowpipe.

Before leaving this very important subject I would name a few of the great points of importance to us as gas managers, that the gas furnace has over the present system:—1. We could use an inferior description of fuel, such as a mixture of coke, small dross or peat. 2. The cost in the retort house would be reduced by having fewer stokers. 3. The amount of work done by each oven would be greater, owing to the almost unlimited calorific power at our disposal. 4. A larger yield of gas per ton, owing to the uniformity at which the distillation could be carried on. 5. The durability of the retorts would be extended, having dispensed with all clinkering and feeding the fires.

In the ordinary system the draught of the chimney has full scope of the entire setting, and causes a diminution of temperature, consequently a slight contraction of the retort; and the air admitted during these operations, say at 60 degrees, is heated, say, to 1200 degrees, and it is quite evident this increased temperature is due to the heat of the setting, and that therefore there is a loss of heat on the retort setting. This great loss of heat is obviated by the use of the gas furnace.

I may mention that the nearest approach to the gas furnace in retort setting that I have yet seen is that carried out by Mr. Hislop, of Paisley, where he takes advantage of the waste heat of the flues to heat the air previous to its admission to the ovens, which is done by an ingenious arrangement of vertical flues and small dampers, although I don't think Mr. Hislop would set his arrangement against the one I have just described.

For many years there has been a great desire on the part of not a few gas engineers to have the hard and laborious work of the stoker, if not supplemented, at least reduced to a minimum, by the introduction of mechanical appliances. In no piece of apparatus in connection with gas manufacture is there greater diversity of engineering skill shown than in the machines patented from time to time for charging and drawing retorts, each patentee thinking, no doubt, that he has solved the problem. As this is a subject I take considerable interest in, my inclination was to have gone fully into it, but the time at my disposal would not admit such a digression. I fully expected to have been able to give you at this meeting a few facts as to the working of the two systems which claim the supremacy for charging and drawing retorts. I refer to the Foulis and the West machines.

Feeling assured that the days of shut gates to brother managers were ended, I put myself to considerable inconvenience so that I might see the

two systems at work. I visited the works where these machines were in operation, and was most courteously received by the engineer, who unfortunately had another engagement, and could not accompany me to see the machines at work. Before leaving me, however, a message was sent to one of the patentees, stating that I was there and wished to see his machine working—my curiosity being increased on having read the figures appearing in the *Journal of Gas Lighting*, a few issues before my visit, as to the amount of work capable of being done by this particular machine. I waited till my Scotch patience was exhausted, without seeing the patentee or his machine, and I left the station no wiser than when I entered it. Since then, however, a "report" has been issued on the two systems after a comparative trial, and which requires no remark from me, as any gas manager can form his own opinion of the various circumstances and the results. One point brought out in connection with Mr. West's machine, and to which there appears to be attached considerable weight, is the breaking of the coal. I believe it to be the experience of many gas managers that if coal is not broken into reasonably small pieces the yield of gas will not be so great as if it had been; but even on this point there is difference of opinion. I visited a works some time ago where the coal was being charged in lumps having a cube of at least 200 inches, and the yield of gas from that works over the year's working was fully 11,000 cubic feet per ton of coal carbonized, so that in different localities the material to undergo distillation, requires different treatment.

My own opinion is that the length of the pieces is not so much a hindrance to the evolution of the gas as the thickness. As the retorts most in use in Scotland are D-shaped, with a good stoker there is little difficulty in having the charge put in in good time and evenly.

I read some time ago of a meeting of gas engineers, where mechanical stoking was the subject of meeting. One gentleman mentioned that the time for charging and drawing a retort was nine minutes. Then, in these circumstances, a great saving could be effected by that gas company with the use of the mechanical stoker. I consider the time mentioned much in excess of what might be. An oven of five retorts by two men can easily be drawn and charged in from ten to twelve minutes, but we must look to having a simple, reliable machine, and companies having works laid down suitable for their use ought to encourage every attempt at overcoming the difficulty. The patentees of the two machines I have mentioned, and also Mr. Warner, of South Shields, for their endeavors in this way deserve the best thanks of the whole gas community.

That every gas manager should have means of satisfying himself as to the position he has attained in the production of gas from the material employed, it is essential that he should make periodical testings of the deliveries at his works, because, although analysis of the coal produced at the pit at this date be correctly made, it might bear a very indifferent relation to the coal raised from the seam this day six months. We have many instances of changes or variations of quality of the same seams in this district, so much so that in two pits belonging to the same firm the difference in the yield of gas per ton of coal is known to vary from 1000 to 1500 cubic feet, and the quality from one to two candles. Take the Kirkwood seam as another example of the changes in the same strata—two pits within a short distance of each other. The No. 1 coal, as it is named, gives over 1100 cubic feet more gas than No. 2, and the quality of the gas is 1¼ candles better. In fact, in one part of the field operated by one of the pits named, the two classes are raised, the physical characteristics of the coal being very different.

I only cite these two instances to show that a change in the quality of the coal may occur while the seller may be acting with perfect honesty toward the purchaser. He cannot foretell the upheavings of the field he is engaged in, all having their dip and rise, their faults and dislocations, which might throw the seam up or down, or thinning out and away from him altogether. But in all these changes how important it is that the managers might be able to know, both for his own satisfaction and that of his company, the constituents of coal, which may be classed in the following order:

1. The combustible non-illuminating constituents.
2. The illuminating hydrocarbons.
3. The constituents that are not essential as regards illumination.
4. Thei mpurities.

As there are not two seams alike in the proportion of these constituents, hence the cause for, and the advisability of gas managers endeavoring to overcome any little difficulty in the way to enable them to make periodical tests for their satisfaction of the material they are called upon to use.

I fully expected that we should have been favored with a paper on scrubbing and washing, by Mr. Monk, Lanark, and I regret very much that he has not been able to see his way to give it. This is a subject of great importance, and, as far as I can learn, Mr. Monk has been very successful in his adaptation. His arrangement is thoroughly unique, and is effective in its action. I trust that at no distant date we will have Mr. Monk with a paper on his whole system of condensing, scrubbing, etc.

The amalgamation of the two associations is again to be brought up, and this time for disposal. I hope you will consider calmly the importance of the step under consideration; the change cannot injure the association asking your co-operation, but I am afraid many members who have stood by this association in the struggles of its infancy will be somewhat difficult to convince of the improvements that may accrue from the annihilation of the West of England Association as it now stands. Seeing, then, that it is a matter of great importance to you as members, I again ask you to consider well what is your duty in the best interests of the Association and the advancement of the object of its existence.

Mr. Niven has been induced (no doubt from his experience of the now recognized tables for correcting the quantity and quality of gas under examination) to strike out in a new line of thought, and, as it, were, to make a short cut. From Mr. Niven's clear, philosophical mode of reasoning, and his good sound logic, I have no doubt we will have a paper from him highly interesting and instructive. Most of us who have used the tables have found, I dare say, very little inconvenience in their application, but we will be very glad to hear Mr. Niven's views on the subject.

We have a paper from Mr. Brodie on gasholder construction. From the nature of the subject, and his long experience on the work on which he has kindly consented to give a few remarks, I have no doubt it will be like its author—thoroughly practical, and full of good sound advice.

Mr. Hislop's lime process. On this I will say but little, as the report of our committee will fully convey to you their finding of a test made under their supervision.

Mr. Mayer has volunteered his services at this meeting as a contributor, by way of a paper on "Painter's Hydrostatic Joint for Gas and Water Mains." It is a little unusal to have gentlemen outside of the Association giving papers, but if the end and aim of the Association is to be attained, papers must be forthcoming. There are many inventions and new adaptations in every department of the manufacture and distribution, which can not fail to elicit much interest and profitable discussion, and the members must really consider their duty to the Associrtion. We cannot all be listeners, otherwise the progress will not be creditable to the character of the Association. Hitherto the work done has been good, and I may be pardoned if I say not without its influence and benefit to the gas world. It is not necessary that the papers should be embellished in fine oratory. We want the important subjects connected with our everyday experience brought forward and discussed in a simple, homely, and busines-like manner. Then the giver of the paper will be benefited himself, and will have the pleasure of knowing that he has contributed his quota to the furtherance and extension of the usefulness of the Association, because it is by individual effort that success alone can be attained. I consider it an injustice to your own feelings if you are possessed of an opinion on any subject which may be under discussion, should you through diffidence allow the opportunity to pass without giving expression to it. Do your part of the work nobly. You would not consider it complimentary if some of your neighbors were to undertake the management of your affairs. In the same spirit show that you realize the responsibility you are placed under to the Association by forming a part of its membership and doing your share of its work cheerfully, and show that you are worthy of membership in an Association which has for its object mutual improvement and advancement in our professional duties. (Applause.)

Mr. Dalziel—I think we should give Mr. Mitchell a hearty vote of thanks for his address. He has brought many things before us which ought to excite our attention, and among others that of mechanical stoking. Stoking is the most laborious part of our profession, and an improvement in this direction would be heartily welcomed. We should warmly thank our President for referring to this and other details as to which our memories are the better for being refreshed. (Applause.)

The President acknowledged the compliment.

Fire and Panic.

The gas works connected with the Grant Locomotive Works at Paterson, N. J., caught fire yesterday afternoon. The flames spread with great rapidity, and communicated to a row of five tenement houses adjoining, all of which were destroyed. It was with the greatest difficulty that the flames were prevented from destroying the main part of the works and the surrounding industries, the fire occurring in that part of Paterson where mills and factories are the thickest. Owing to the scarcity of water, the fire apparatus could not work to the best advantage, and it was only by the earnest endeavors of the employees of the various establishments that a more serious conflagration was prevented.

At one time the roofs of over a dozen dwellings and mills were on fire, and general consternation prevailed. In the Murray mill, in which some six hundred hands are employed in the silk industry, there was a panic, as it was reported among the operatives that the mill was on fire. Several of

the female employees fainted, but no serious accidents occurred. About fifteen families were made homeless by the conflagration, and many of them lost all their furniture.

The loss on the Grant Works, owned by a corporation, is estimated at $6,000; fully covered by insurance. The tenement houses were the property of John Johnson, whose loss is estimated at $11,000; covered by policies to the extent of $6,000. Besides this several other buildings were more or less damaged, making a total loss of somewhat over $20,000.—N. Y. *Herald*, May 21.

The Prevention of Smoke.

A committee was appointed some time since by the Citizens' Association of Chicago, to which was referred the question of recommending some means by which the nuisance of smoke can be abated. This committee, consisting of R. T. Crane, G. W. Blatchford and D. H. Hale, report as follows:

It was well known at the outset that much time and research had heretofore been given to this important matter by the best scientific talent in the world, for many years, without much benefit from practical results, but we were unprepared for the eagerness with which we were met on all sides by those who were anxious to forward our views, and were gratified to find public interest so much aroused and desirous of our success in ascertaining some measures for relief from the smoke nuisance. The same agitation appears to be going on in Great Britain, where corresponding societies have been formed in the larger cities for the sole purpose of dealing with this question, and we can say right here that we cannot ascertain from our correspondence that any greater progress hes been made there, nor any better or essentially different devices discovered, than here, for the prevention or combustion of smoke.

It is not out of place to refer briefly in this report to the scientific principle which underlies all proper and systematic efforts to prevent smoke, for it is its prevention and not its destruction or consumption that should be aimed at. This principle is the complete combustion of the gases which arise from the consumption of fuel. Let there be complete combustion and there will be no smoke, properly speaking, although almost invisible vapor or gases will arise from the chimney tops. To promote this complete combustion atmospheric air, in the proper quantity, must be admitted to the furnace and be allowed to mingle with the gases, while at the same time they should be brought together by some mechanical process, and not allowed to escape through the flues until their use has been of thorough avail by their complete combustion; the residuary vapor alone should pass out above. In ordinary furnaces, when in charge of careless or incompetent men, this cannot be done, and the dense volumes of smoke that are seen rolling from the chimneys of some manufactories are a sure indication of carelessness or incompetency in the boiler room. But, however well the fireman may do his duty, there will be at all times a good deal of smoke, unless some simple contrivance is used to assimilate the gases and supply the proper modicum of atmospheric air or superheated steam, so as to produce perfect combustion, and the various devices and inventions brought to our notice have been recommended as combining, in a greater or less degree, the scientific and mechanical principles herein alluded to. It is not our object to recommend any particular invention, nor even to point out the excellencies of any mode or system for preventing smoke. The inventions and devices are almost innumerable, the patents issued are several hundred and the number rejected much greater, and many of them possess merits of their own. They include: A water drum (with leg) in front of the bridge walls and inclined bars; deflecting arches in front and rear of a hollow iron bridge wall, perforated for the supply of air; such an arch over the bridge wall, with an arrangement of the furnace doors so as to supply the proper quantity of air; surface-draft inventions, combining the application of hot steam and atmospheric air; a perforated fire-box for the incandescence of the fuel in front of the flues, with a gas chamber and arrangement for the supply of air or steam; automatic feeders of various patterns, including one which pulverizes the fuel and spreads it evenly upon the burning mass under the boilers; various applications of superheated steam, gas and hot-air chambers, for the admission of air into the furnace. All these have, as stated, merits peculiar to themselves. We incline to the belief that no plan can be perfectly worked without intelligence in the boiler room—no device will display its own complete capacity.

We are indebted to some of the great railway companies of England and France for drawings of the simple apparatus used by them in locomotives and for the history of previous experiments. They agree that smoke can be prevented to a great degree by the use of these appliances, but lay great stress on the stoking or, as we call it, firing. Some companies commend the use of coke when within cities, others that the stoking or firing shall be completed before entering the city, so that new fuel need not be added therein. We are of opinion that these suggestions should receive great consideration, as, if the switch engines could be confined to the use of anthracite, and other locomotives be provided with simple apparatus and fired with care while approaching and within the city limits, much of the annoyance from that source would be stopped.

The subject is of such great importance that it has engaged the attention of our municipal authorities, and a proposition is now pending to enforce the prevention of smoke by a city ordinance. We take pleasure in stating that we are in accord with the city administration in our endeavors to bring about an abatement of this growing nuisance. The time and circumstances are very opportune, and public sentiment is strongly with us.

From all the evidence examined by us in the shape of correspondence, and from our personal observations of smoke-preventing apparatus in this city, we are of the opinion that the smoke nuisance, as far as it proceeds from stationary boilers and tugs, can be abated so as to be inoffensive, and we recommend that a city ordinance be passed for that purpose, to take effect within such a time as will give all persons interested an opportunity to fit their works with such apparatus as they may deem best for the purpose. The same opinion applies, measurably, to locomotives, and they should be included in the ordinance. Such a law, in its details, should contain provision for an adequate penalty for its violation from any cause except unavoidable accident, and for one or more inspectors constantly engaged in its execution.—*Iron Age.*

Labor Statistics.

The Massachusetts Bureau of Statistics of Labor is doing a good work in gathering up the figures which throw light upon the great labor problems of the age. Among its recent issues is a report upon the strikes occurring in that state, which is of special interest now that we seem to be entering upon a new age of strikes. Men almost everywhere are demanding higher wages, too often without inquiring whether the business in which they are engaged can afford to pay them or not.

Because goods are selling in the market for a higher price is no certain evidence that employers are making more money. In many instances they are making less rather than more, being bound by contracts to old selling figures, while prices at which they buy material have enormously increased. But, aside from contracts, it may be doubted whether prices of manufactured articles generally have risen as rapidly as the prices of raw material. No doubt it is just that the workman should share in the prosperity of his employer; but it is also just that the employer should have real and not merely apparent prosperity before he is called upon to divide. Dividing losses is not what the workman asks, or can stand. Dividing gains is in order only when real gains have come.

But if we may credit the figures—as we must—experience in Massachusetts does not show that strikes are the way for workmen to gain their end. It was not till the year 1830 that labor in factories in that state assumed such shape that strikes began. Since then there have been in the state 159 strikes. Of these 32 took place among native workmen and 127 among foreign. 59 were in cotton or woolen mills, and 34 in the shoe trade. But as the result of all, 119 failed completely, 10 were compromised, 6 partially succeeded, and 18 entirely succeeded—that is, the absolute failures were nearly 7 to every absolute success. This is certainly not an encouraging record for the strikers.

Statistics gathered over a wider field—though perhaps not so carefully gathered, and therefore not so reliable as these in Massachusetts—are said to show that not more than one in ten strikes succeeds in attaining its end. The loss in time and money to the strikers is, beyond all comparison, greater than the gain.

The competition of prison labor has also figured very largely in the discussion of the labor problem, and the Massachusetts Bureau has been at great pains to gather the facts on this subject. They find that in the whole country there are 129 penal institutions, the inmates of which are kept more or less at work. The whole number of inmates of these institutions is 47,769, and the number employed in labor of one kind or another, 40,122. Of the latter, 4930 are engaged in duties connected with the prisons themselves, leaving 35,192 to compete in general industries with with the whole force of the "free labor" of the country. Of this last number 23,524 are employed at "skilled" work—that is, in mechanical trades and various kinds of manufacture, and 11,668 at "unskilled" work—on farms and plantations, in quarries and mines, on roads and levees, etc. The number of convicts set down as farmers and laborers is 10,607. The department of manufactures in which the largest amount of prison labor is employed is that of boot and shoe making. Convict crispins are at work in the penal institutions of 26 states, and the total number employed is 6581. The whole number of persons engaged in the same industry in these states is 129,989, and in the United States 135,889. Thus, less than five per cent. of the boot and shoe making of the country is done in prison.

The manufacture of iron comes next in importance to boots and shoes in

our prisons; but it is found that of this work not more than two and one-half per cent. of the whole is done in prisons. Convicts do about five per cent. of our stone work, and make about five per cent. of our furniture, but not more than two per cent. of our clothing. Other prominent prison industries are carriage making, the manufacture of brooms, brushes, woodenware, hats, leather goods and cigars and tobacco. The ratio to outside workers varies from a fraction of one per cent. to about ten per cent., but in general the variation is between two and six per cent. An average of three to four per cent. of the whole manufacturing of the country is done in prisons.—*N. Y. Mercantile Journal.*

[Official Report.]

Proceedings of the First Annual Meeting of the Central New York Gas Engineers' Association.

HELD AT THE GLOBE HOTEL, SYRACUSE, NEW YORK, MAY 20TH, 1880.

The meeting was called to order, at 10 A.M., by President Wood. The following members responded to the roll call:

A. C. Wood, Syracuse, *President.*

John McDougall, Hornellsville,	John D. Higgins, Rome,
F. D. Kingsbury, Corning,	P. Clark, Oneida,
C. A. White, Rochester,	Wm. Humphrey, Dansville,
Wm. Cartwright, Oswego,	J. S. Bull, Cortland,
W. A. Wood, Syracuse,	Wm. Parish, Seneca Falls,
L. C. North, Canadaigua,	M. Harrington, Niagara Falls.

On motion of Mr. Kingsbury, the reading of the minutes of the last meeting was dispensed with, and the minutes as published were approved.

The President addressed the Association as follows:

Gentleman of the Association—We are assembled at our first annual meeting, and it is exceedingly gratifying to me, as one of the projectors of the organization of the Association, to see so goodly a number present on this occasion.

One year ago, at our organization, there were present sixteen representatives from the forty-three gas companies within our territorial district. During the year several have joined us so that we now have a membership of twenty-two, showing that one-half of the gas companies in the district have not yet seen fit to send their superintendents to our meetings. This may be accounted for by an indifference on the part of the superintendents in not properly calling the attention of their directors to the importance and usefulness of these meetings for consultation and comparison of results obtained; or, it may be, that they depend upon reading a report of our proceedings, as published in the Gas-Light Journal, thus securing for themselves the advantage of our experience without imparting their own. Some of those who have not joined our Association represent the largest works in our district, while others represent the smallest. We would say to all of these that they each have much to learn and much to impart. In this business of ours no one (however large his experience) but has something yet to learn of its details; and he can often obtain some useful information, learned from the experience and close observation of those in charge of the smallest works, and these last can confer a benefit by imparting such knowledge to others. Concerted action is always more effectual than independent or individual action, in short, "two heads are better than one."

In these times of cheap oil, electric light, and claims of making cheap gas from oil, water, wood, etc., etc., it behooves us, and it is our duty, to obtain all the information possible as regards material or machinery used in the manufacture and manipulation of gas, and in all its details, whether made from coal, oil, water or other materials, and also to obtain the best results possible; and, in our respective works there is no better way of arriving at this than by frequent consultation and comparison of results obtained with those who are working to that end. At our meetings these things are all discussed greatly to the advantage of those who are in attendance.

Large gains have been made in cheapening the cost of manufacturing coal gas during the past ten years, notably, during the last six years, much of which can be attributed to the meetings of the several associations which have been organized in different parts of the country, at which meetings papers have been read and discussed, and valuable information given and received, causing a friendly rivalry among the members to spring up, each striving to emulate the other, resulting in large gains and great good to all. These results would not have been obteined attained without the aid, influence and advantages of these associations; and the directors of any gas company, however large or small, can make no better investment than to send their superintendent or engineer to these meetings, and it is the duty of the superintendent to properly lay the matter before their respective boards or their proper officers tha tthey may well understand it.

The results of our meetings during the year have been very satisfactory. Many valuable papers have been read and discussed, and much valuable information has been received by those who have been in attendance, and you all no doubt feel amply repaid for the time and expense incurred in attending the meetings; and that the information you have acquired, and the knowledge you have gained has been of benefit to yourselves, your respective companies, and your consumers.

Our by-laws provide for four meetings in each year. We have heretofore transacted our business in one day; and as many of our members come from a distance, we cannot convene before ten or eleven o'clock in the morning, and adjourn by six o'clock in the evening, and with one hour for dinner we have but about six hours for business.

This is too short a time, and often cuts short the discussion of important papers and topics. In view of the above considerations, and from the fact that many of our members have a long journey to perform in order to reach the most central portions of our district where the meetings may be called, I would suggest that we hold our sessions for two days; and although I am decidedly in favor of frequent meetings, and believe they can be made profitable to the members if held as often as once a month, yet with due deference to those who live at a distance, and have from 200 to 400 miles to travel to attend a meeting, I think it would be well to consider the feasibility of changing our by-laws so as to hold two meetings for two days in each year.

With perhaps one or two exceptions, the members of our Association are engaged in the manufacture of coal gas. But there are claims for cheap gas, made from coal, wood, water, petroleum, and its various products, under some patent process. These processess increase in numbers and repeat themselves over and over again to a surprising degree, and after having been tried and abandoned in one locality will again be brought out under the same or a new name with, perhaps, a slight change in the apparatus, in another place, only to be again abandoned for coal gas. Many of these so-called "new processes" have been tried and abandoned in some foreign country to be brought out in this country new in name only.

Mr. Eugene Vanderpool says of water gas—

"The decomposition of water by means of incandescent carbon was accomplished in 1793, and since then much time, energy, money and intelligence have been devoted to the problem of making water gas economically as compared with coal gas. This problem has not been so solved that the solution has been accepted by those qualified to judge of its success."

I have examined into the merits of very many of these water gas and other new processes which have been presented from time to time, but have never been able to obtain any reliable information that has shown any advantage over coal gas either as to cost of production, quality of gas, or in any other particular. The manufacture of water or oil gas in the immediate vicinity of the anthracite coal or oil regions, or where these materials can be purchased at a very much less cost than bituminous coal, shows a slight gain in the cost of production. Under no other circumstances have I found the water or other gas process to show any advantage over or equal to coal gas, and this gain finds an offset in the extra care and risk in handling so inflammable a material as is used in making these gases.

But these patent gas process men who have no interest save getting the largest possible amount of money out of their enterprises, say that the coal gas men are conservative, and prejudiced against their processes. We are conservative in our own interests, and guard against imposition; and when we see these schemes brought forward, and one after another of them utterly fail to show any advantage over the results we are already obtaining from coal, we are forced to be conservative, and are prejudiced against any figures they may be able to show on paper, from results obtained by interested parties—for experience has shown us that they fail to give us any advantage over our present methods. But we gladly welcome any improvement in apparatus or material that will reduce the cost of manufacturing gas so as to lessen the expense of burning it to our consumers. It is a matter of business interest for us to do this, and so looked upon by gas men everywhere.

The coal gas men are laboring to that end. We have made many improvements in manufacturing gas during the past few years, and will continue to make improvements for the benefit of our consumers and ourselves.

On motion of Mr. Kingsbury, a vote of thanks was tendered to the President, and a committee of three appointed to consider the changes in the by-by-laws suggested in the Presidents' address. Messrs. McDougall, Cartwright, and Kingsbury were appointed as such committee.

Moved by Mr. White that a committee of three be appointed to report a list of officers for the ensuing year, such committee to report at once. The motion was carried, and the President appointed Messrs. Bull, Humphrey, and Clark. A recess was taken, after which the committee reported the following officers:

President	A. C. Wood
First Vice President	John McDougall.
Second "	Wm. Car:wright.
Secretary and Treasurer	C. A. White.

Directors.
William Humphrey.
D. M. Dunning.
L. C. North.
J. D. Higgins.
F. D. Kingsbury.

The report of the committee was adopted, and the Secretary instructed to cast the ballot of the Association for the names reported.

Mr. McDougall presented the name of C. E. Hequemburg, of Dunkirk, President of the Bradford, Pa., Gas Company, for membership in the Association. The Secretary was instructed to cast the ballot of the Association for Mr. Hequemburg, and he was declared duly elected.

The Secretary announced a communication from Mr. H. Q. Hawley, of Albany, in relation to gas stoves. On motion, the communication was received and placed on file.

Mr. McDougall presented a communication from Mr. Hequemburg, President of the Bradford, Pa., Gas Light Company, inviting the Association to hold its next session at Bradford.

On motion of Mr. Kingsbury the invitation was accepted, and the Secretary instructed to return the thanks of the Association to Mr. Hequemburg.

As a continuation of his paper read at Rochester, February 19th, Mr. M Harrington, of Niagara Falls, presented the following, on

NAPHTHALINE.

Mr. President and Gentlemen—At our Third Quarterly Meeting I was requested to prepare a paper upon the subject of naphthaline, to be read at this our annual meeting.

In compliance with that request I again appear before you.

As a panacea for this troublesome deposit I desire to present for your consideration the subject of condensation. In my previous paper I attributed the cause of its formation to manipulation rather than material used.

In support of this opinion I would invite your attention to the following workings and observations. Coal gas works in general are using what is called a caking coal, very rich in hydrocarbons, which, to be extracted, necessarily require the application of high heats, thereby obtaining large yields.

I contend that this extra gain is obtained from the distillation of the tar, the product being the richest hydrocarbon constituent in the formation of the coal.

By reference to page 71, vol. III., Proceedings of the American Gas Light Association, I find the chemical formula to be $C_{10}H_8$.

This hydrocarbon is held in suspension by the crude gas in its heated condition, but upon cooling or condensing it again necessarily comes in contact with the tar (its original base), which, having an affinity for its lost properties, arrests it from the gas, depositing it in the form of naphthaline, the chemical affinity being insufficiently strong to again convert it into tar.

Universal experience has fully demonstrated that the use of block coal will invariably alleviate if not effectually remove the trouble during its use, it again appearing upon cessation.

This, to my mind, is conclusive proof that the condensing theory is correct. The block coal being a very lean coal in comparison with the caking coal, it does not produce the rich tar, and consequently there is not the gain in the rich hydrocarbon.

Where block coal is used in connection with caking coal, the former produces sufficient lean gas to absorb any excess of the hydrocarbons given off by the richer tars produced from the latter coal.

As this naphthaline is a valuable light-giving constituent, the question for our consideration is how to produce the desired condensation without its attending evils, and, at the same time, avail ourselves of all the illuminating properties of the coal.

Shortly after our last meeting I was afforded the pleasure of visiting a works in a neighboring state where experiments were being conducted with the view of removing this hydrocarbon from the tar and incorporating it with the gas.

To effect this desired result the residual products from the hydraulic main are retained and maintained at a high temperature, thereby separating the hydrcarbons and delivering them to the gas in its heated condition, in which condition it is capable of holding them in suspension, the condensation being very gradual, thus enabling the tar to separate and pass off before any deleterious effect can be produced.

My former paper has been the medium of furnishing me with a communication from Mr. Henry Aitken, of Falkirk, Scotland, who has given this subject considerable attention, in which he has kindly furnished me with plans and specifications as to patents he has obtained in reference to this vexatious deposit. While I wish it understood that I am not here to advocate anybody's patent, I have taken the liberty of presenting a few of his claims, all of which, I think, have a bearing upon the subject of gradual reduction in temperature.

In his application Mr. Aitken says he proposes to improve the manufacture and enhance the illuminating power of coal gas "by improved methods or means of treating the crude gases evolved in the process of manufacture, whereby the gases as they are produced are enabled to retain or to become saturated with the volatile hydrocarbon vapors and rich gases, which, by the ordinary methods of making illuminating gas, are absorbed by or carried off in the tar and aqueous vapor. * * * It is known to gas managers and others engaged in the manufacture of illuminating gas that the condensible tars do not separate from the crude gases as soon as the temperature falls below their boiling points, but that are carried forward mechanically suspended in the gases, and hence one of the uses of the scrubber to rub out the mechanically suspended matters after the gases have been cooled by the condensers.

"It is also well-known that illuminating gas is principally indebted for its illuminating power to volatile hydrocarbon vapors diffused through it, and that similar vapors are abundantly contained in the tars.

"I have found that the treatment of the crude gases at present practised is wasteful, and greatly deteriorates the illuminating power of the gas, for by the present treatment the cooled heavy tars mechanically carried forward and brought into contact with the cooled gases, have the property of absorbing the very volatile hydrocarbons which, if allowed to remain in the gases, would have much improved their illuminating power.

"I have further found that the presence of aqueous vapor in gases prevents them from absorbing and from retaining hydrocarbon vapors, and that gases in the presence of aqueous vapor deposit their light-giving constituents.

"I have also found that by depriving gases of aqueous vapor they have the power of retaining and absorbing hydrocarbon vapors to a greater extent, and so increasing the illuminating power of the gases beyond what is obtained under the existing practice.

"I have further found that by slowly cooling the gases, and keeping the tars at a temperature of 190°F. or thereabout, the said tars are prevented from absorbing from the gas those hydrocarbons which they carry off under the existing method of manufacture in which the tars are kept in contact with the gases at a lower temperature such as that of the atmosphere." *

Mr. Aitken specifies several methods and forms of apparatus for attaining the desired result, but one of which we shall take occasion to notice. He says:

* * * "Under a fourth mode a very large chamber is employed, into which the gases leaving the retorts escape, and are slowly cooled to a temperature preferably not less than 90°F.

"This chamber is kept warm either by being placed in a warm house, or, by having a steam pipe passed through it, or by other equivalent means, the object being to allow the tars that are mechanically suspended to settle out at a temperature at which they do not absorb the volatile vapor and other hydrocarbons from the gas. Instead of the chamber, a large pipe or series of pipes, heated to the required temperature, may be used. The gases are passed from this chamber, or from the pipe or pipes, to be further condensed and then conveyed to the purifiers." * * *

In all the foregoing arrangements the great point to be arrived at is to prevent the tars and gases coming together at a temperature at which the tar will absorb the rich hydrocarbons, and although this point will vary with different classes of material, which will be easily ascertained by experience, I have found that very good results are arrived at by not allowing the temperature to fall below 190°F.

Another part of the process refers to the removal of aqueous vapor by means of caustic lime or other absorbent, and the gases so dried may be enriched by passing them through or over substances like tar or oil rich in volatile hydrocarbons, and heated to about 190°F.

A testimonial from Mr. Bell, of the Gibraltar Gas Works, who used Mr. Aitken's process, proves

1st. That it is a complete cure for the naphthaline nuisance.

2d. That gas, when so treated, will carry forward naphthaline into the gas flame, which point had been previously proved experimentally by passing gas over and through naphthaline after the gas had left the holder, and

3d. An increased illuminating power.

A committee of the West of Scotland Association of Gas Managers appointed to examine the process, say in their report:

"When the ordinary process was thrown into action, the gases as they issued from a ¾-inch stop-cock, placed on the inlet to the scrubber, had a brown smoky appearance, and, when allowed to blow on a piece of paper, gave a black, tarry stain. On the other hand, when the analyzing condensing arrangement was thrown into action, the issuing gases were comparatively colorless, and gave only a slight brown stain to the paper, which rapidly dried upon exposure to the air." * * *

In conclusion, if his theory is right, and I see no valid reason for thinking otherwise, is it not worthy of our serious consideration, and what to-day is a very troublesome guest may, in the near future, be ever welcome to our

works, and our constant aim be to entertain in such a manner, that its sojourn may be of long duration and equal assistance.

Mr. Harrington passed around for the inspection of the members three vials containing samples of the deposit which gave him trouble. No. 1 contained a black mass, presumably a mixture of tar and naphthaline. No. 2 was similar in appearance to No. 1, and was the tarry residue obtained after applying steam to No. 1. No. 3 contained the ordinary white crystals of naphthaline. Nos. 1 and 2 were found exclusively at the works. No. 3 was found in the service pipes, and condensed whenever steam was applied to No. 1 about the works.

A vote of thanks was tendered Mr. Harrington for his paper, and a discussion on the paper by the members was invited.

[To be continued.]

A Sleep that Ended in Death.

A STRANGER SUFFOCATED BY GAS IN HIS ROOM AT FRENCH'S HOTEL.

Shortly before twelve o'clock on Wednesday night a well dressed gentleman of about sixty-five registered his name at French's Hotel and asked for a room. He was dressed in a dark-blue suit, and wore a straw hat, which with his well browned face gave evidence that he had recently traveled and been exposed to the sun. His hair was gray, as were also his side whiskers. He seemed to the night clerk, Mr. McAllister, to be in good spirits, and to wear the appearance of a prosperous man. He signed his name Louis Baker, Washington, D. C., in a firm hand, near the bottom of the page. "I suppose you would like me to pay in advance," he said, "since I have no baggage? My baggage will be brought here to-morrow from the steamer on which I arrived to-day." He paid for his room, and was assigned to No. 76, on the second floor, facing on the courtyard. He did not retire at once, but said he would go out first for a stroll. He returned at about one o'clock—at which time another clerk, Mr. Kohler, had gone on duty—and asked for the key of his room. He was shown to it, and was never again seen alive.

Between seven and eight o'clock yesterday morning one of the chambermaids noticed a strong smell of gas in the hall, and traced it to room 76. The door was broken in and Mr. Baker was found to be dead. He lay on the bed with only his shirt on. The gas was out, but was still turned on. The window was shut, precluding the theory that the gas might have been put out by the wind. It was supposed that Mr. Baker had himself blown it out, although his age, the fact that he lived in a city where gas was commonly used, and his general appearance, made it seem doubtful that he could have done so in ignorance of the deadly effect of unburned gas. The clerks, however, had noticed nothing in his appearance indicative of a purpose to take his own life, and all who saw him alive are clearly of the opinion that his death was accidental. Mr. McAllister said that persons had sometimes gone to sleep in their rooms in the hotel with the gas escaping, but in no previous instance had it resulted fatally, the watchmen always having detected it by the odor in time to save life.

In Mr. Baker's clothing were found a wallet containing a small sum of money, and several unimportant papers, among which was a notice of the funeral of George Baker, supposed to be his brother. No baggage had been received for him at the hotel up to a late hour last night, nor had any inquiries been made by his friends. The body was taken charge of by the coroner yesterday morning, and sent to the undertaking establishment of Charles O'Neill, at No. 102 East Twenty-sixth street.—New York *Herald*, May 21.

A New Gas Engine.

Messrs. G. Linford & Co., Sydney St., Leicester, Eng., have introduced an entirely new engine of their own invention and make, and they claim for it that it is the only gas motor at present in the market that is of entirely English ideas in its details, all the others now being made here being of foreign origin. As the Continental patents are not yet complete, we are requested not to be too precise in our description of its details. It is of verticle form, not unlike some steam hammers in its outline; it occupies less space than any other of similar size, and requires no foundation. They are at present made of one, two, and three horse power. The air and gas are admitted together in the usual manner by two pistons working simultaneously in opposite directions, the return stroke compressing the charge, the explosion or combustion occurring whilst proceeding on its outward stroke. The power is transmitted by rocking levers or cams to connecting rods, coupled direct on to cranks, which, being opposite to each other, avoid all shock on the crank-shaft. The number of explosions is regulated by an ordinary governor, the gas consumed being in reality in accordance with the amount of work required to be done, and the cost in full working will not exceed about ½*d.* per horse power per hour. The speed can be controlled with the greatest ease at from 120 to 300 revolutions per minute. The main shaft bearings being relieved of all friction, on account of the even balancing of the engine, only the friction from actual amount of power transmitted remains on the shaft and crank pins, therefore high speed can be obtained without heating or jarring—a fault hitherto visible with the best gas engines—and considering that its first cost covers, so to speak, all expenses, this motor must be considered amongst the cheapest and, we think we may safely say, one of the best in the market.—*The Ironmonger.*

PERFORATING GLASS BY ELECTRICITY.—A simple method of perforating glass with the electric spark is described by M. Fages in a recent number of *La Nature*. The apparatus required consists (1) of a rectangular plate of ebonite, its size, for a coil giving 12 ctm. sparks, about 18 ctm. by 12; (2) of a brass wire passing under the plate, and having its pointed end bent up and penetrating through the plate—not farther. This wire is connected with one of the poles of the coil. A few drops of olive oil are placed on the ebonite plate about the point, and the piece of glass to be superposed, care being taken not to imprison any bubble of air. The olive oil perfectly accomplishes the object of insulating the wire. One has then only to bring down a wire from the outer pole of the coil, on the piece of glass, above the point of the lower wire, and pass the spark. By displacing the glass laterally for successive sparks, it is easy to make a close series of holes in a few seconds.

Correspondence

Personal Experience of One Overcome by Gas.

————, May 18, 1880.

Mr. Editor:—On perusing the last issue of your valuable paper I notice another of those rather frequent cases of suffocation by illuminating gas. Having had some experience in this matter myself, I can speak from personal knowledge.

The natural result of inhalation of gas in large quantities is to produce insensibility on the part of the patient. This everyone who has witnessed such a case well knows. Now the question I wish to raise is this, for what length of time can this unconscious condition continue, and to what degree can it reach before life is actually extinct?

Now, what are the best means of inducing a return of consciousness, and how long should the efforts to restore the patient be continued? The doubt in my mind is whether the sufferer is dead when ordinary means fail to produce signs of life.

I am not writing this for the purpose of getting up an argument, but wish to contribute my mite toward the relief, if possible, of any future victim of suffocation by *coal* gas. I will now relate what I know about gas suffocation.

About ten years ago, while tapping a main in the old-fashioned way—that is, first using a commom flat drill, next a reamer, then a taper or plug tap—the main being under full preasure, I naturally allowed some gas to escape. In vain I begged of the superintendent to be allowed to reduce the pressure; I only received a brutal answer that I "must get used to it." As I was at the bottom of a five-foot ditch, and a scorching June sun overhead, my head soon began to feel strangely. Knowing something was wrong, I climbed out of the ditch, and fell senseless on the street.

Now what I wish to call especial attention to is that after a time my consciousness returned, but to all outward appearance I was the same. I could now hear the different exclamations of the workmen and passengers, all of whom were quite sure I was dead. It was strange to hear their different remarks of pity for my untimely death, and a doctor present declared nothing could be done to help me. I tried to make the slightest motion, that they might see I was not dead, but I felt as if locked in a vice. How long I lay there I do not know, but soon I heard one of the street hands running up, saying, "Get out wid ye all, now; the b'y is not dead—I can fix him." And therewith he inserted his knife between my teeth and pried them apart; then he introduced the lip of a quart can which was full of whiskey, and steadily and surely poured more than a pint of liquor down my throat.

As the firy stuff forced its way down I felt a great many queer sensations, and soon relapsed into insensibility. After a long struggle, during which I had alternate spells of consciousness and insensibility, I finally recovered; but not till nearly the whole quart of whiskey was used.

No use dwelling on the strange feeling of lying there and having all the people declare you dead, and still be unable to make one sign of life. Pat Kennedy saved my life with his natural remedy for all ills—whiskey.

Now, Mr. Editor, is it not possible that in many cases, as in the one just cited, that death has not taken hold when some think it has? And is whiskey commonly known as a remedy in cases of gas suffocation?

If there is anything of value in this letter that may be worth mentioning, I hope you will give it room in your columns. Respectfully yours,

X.

THE AMERICAN GAS LIGHT JOURNAL AND CHEMICAL REPERTORY

A. M. CALLENDER & CO.,
PROPRIETORS.

Editor—G. WARREN DRESSER.

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LIGHT, HEAT, STEAM, WATER-SUPPLY,
VENTILATION, SANITARY IMPROVEMENT,
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WEDNESDAY, JUNE 2, 1880.

Official Report of Examinations of Gas for two Weeks ending May 22, 1880, made at the Photometrical Room of the Department of Public Works.

Corrected Illuminating Power.

May 1880.	Time of Day at which Test were made.	New York Gas Light Co.	Manhattan Gas-Light Co.	Mutual Gas-Light Co.	Metropolitan Gas-Light Co.	Harlem Gas-Light Co.	Municipal Gas-Light Co.
		*	*	†	*	*	†
10		23.86	21.03	27.86	19.67	17.28	31.08
11	Between	21.17	21.18	27.55	——	17.12	30.97
12	9.30 A.M.	26.86	20.96	27.72	21.10	17.37	30.47
13	and	26.56	20.83	27.73	21.92	17.79	30.00
14	1 P. M.	26.50	21.44	27.34	——	17.69	30.01
15		21.54	21.24	27.26	21.85	17.18	30.30
	Average	24.40	21.11	27.57	21.13	17.40	30.47
17		26.45	21.03	27.49	22.20	18.62	30.70
18		25.66	20.84	28.78	21.54	17.78	30.60
19		24.67	20.52	28.26	21.34	18.33	30.63
20		25.54	20.52	26.26	21.57	17.76	30.72
21		25.87	20.82	25.64	22.08	18.90	29.99
22		25.83	20.66	26.82	21.72	18.15	29.89
	Average	25.67	20.73	27.04	21.74	18.25	30.42

* Five foot lava tip with check.
† Bray's slit union, No. 7.

E. G. LOVE, Gas Examiner.

Austrian Petroleum Beds.—A considerable industry exists in the province of Galicia in working the petrolem wells, though its value is depreciated by the difficulty of transportation, the nearest railway station being 30 miles distant. The petroleum field is some 400 miles long by 40 wide, extending from the northwest at Klenyzany to Remairi, in the southeast, and across the Carpathian Mountans to Jaslo. The most westerly of the districts produces about 400 barrels per day, the wells varying from 500 feet to 800 feet, and the oil being refined on the spot. The other districts fluctuate in their yield.—*Ironmonger.*

Melbourne International Exhibition.

The commissioners for this exhibition, which will open at Melbourne on October 1, have delegated all matters connected with the allotment of space to countries of Europe and America to their London committee. The commissioners have decided that the exhibition building shall contain 650,000 square feet of space, of which 400,000 have been reserved for Europe and America. The French government have appointed a commission in Paris, have voted £10,000 toward its expenses, and will forward the exhibits in a ship of war. Germany has adopted a similar course, except that its vote is £12,000, and that it is not at present proposed to send any vessel of war. The Italian government will send a ship of war, and will make certain concessions to Italian exhibitors. The United States have appointed a commission, and the President has recommended Congress to make an appropriation to defray the necessary expenses. The representation of Holland has been entrusted to a commission. Belgium has appointed a commission, and will probably vote £4,000 toward its expenses. The applications for space are as follows:—France, 75,000 square feet; Germany, 65,000; Italy, 42,000; United States, 30,000; Belgium, 25,000; Austria, 22,000; Holland, 10,000; Switzerland, 3,000; other countries, 10,000. The demands for space from British exhibitors amount to 180,000 square feet. The British government has appointed a royal commission, of which His Royal Highness the Prince of Wales is executive president, and by its support has greatly aided the operation of the Melbourne Commission. All information on the subject of the exhibition may be obtained on application to the agent-general for Victoria, 8 Victoria Chambers, Victoria street, S. W.—*The Ironmonger.*

Stansfield v. The Yeadon and Guiseley Gas Company.

This action was brought by Colonel Stansfield, of Esholt, in Yorkshire, to recover damages and a statutory penalty from the defendants for fouling a stream called Yeadon Beck, which flows through the plaintiff's park. The action was tried before the learned judge at the last Winter Assizes at Leeds, and the jury found a verdict for the plaintiff for £100 damages, which amounted to a finding that the defendants had fouled the plaintiff's stream. The question whether plaintiffs was entitled to recover the penalty claimed under the Public Health Act, 1875, was resumed for further consideration, and it was now brought on for argument. The 68th section of the Public Health Act provides that any person engaged in the manufacture of gas, who causes or suffers to be brought into any stream any washing or other substance produced in making or supplying gas, or wilfully does any act connected with the making or supplying of gas whereby the water in any such stream is fouled, shall forfeit the sum of £200. The second further provides that any such penalty may be recovered in the case of water belonging to or under the control of the local authority by the local authority, and in any other case by the person into whose water such washing or other substance is conveyed or flows, or whose water is fouled by any such act as aforesaid. It appeared that in the case no washing or other substance of a like nature was discharged into the stream, but that the stream was fouled, and that the plaintiff was not the owner of the banks of the streams at the spot where the foul water was discharged into it from the defendant's works, two other riparian owners, at least, intervening between the defendant's works and the plaintiff's land.

Mr. Wills, Q. C., who appeared with Mr. Lockwood for the plaintiff, submitted that the plaintiff was the person whose water was "fouled" within the meaning of the Act, and that the recovery of damages did not preclude the plaintiff from recovering the penalty.

Mr. Cave, Q. C., and Mr. Forbes, for the defendants, argued that as the Act imposed a penalty, it must be construed strictly. The right to recover the penalty was limited to the person owning the stream at the point where the fouling was first caused. If the plaintiff's construction were to be adopted, each of the riparian owners for a long distance down the stream would be entitled to recover the penalty. They admitted that the recovery of damages was no bar to the recovery of the penalty.

Mr. Wills, Q. C., in reply, admitted that every person whose water was fouled would be entitled to sue for the penalty, but only one such person could recover it. The act of fouling the stream was one offence, and the liability of the defendants would therefore be exhausted by one *bona-fide* payment of the penalty.

Mr. Justice Lush, in giving judgment said, that the Act was not framed with great precision; but he was clearly of opinion that the plaintiff was the person who was entitled to sue for and recover the penalty. He agreed with the learned counsel for the plaintiff that the penalty could only be recovered once. It was clear from the evidence that the plaintiff's water, and also that of the intervening riparian owners, had been fouled. Any one of the persons whose waters was fouled might have sued, but the plaintiff was the only person who had sued, and therefore he was entitled to recover.—*Jour. Artificial Light.*

Ventilation and Ventilators.

With regard to ventilation the general mass of the public is halting between two opinions; they do not know whether they should open all windows and doors widely and live in a perpetual whirlwind, or close these doors and windows and exist with as small an amount of air as possible. The difficulty that we labor under is that of providing a constant supply of fresh air without draughts, and is considered an insurmountable difficulty. Certainly, we are daily becoming more alive to the absolute necessity of pure air, but amongst the many systems of ventilation it is difficult to choose one. The great faults of many systems lie in their complication and liability to get out of order, or to suffer from neglect or want of attention. There is, however, a good ventilator patented by Messrs. Robert Boyle & Son, of Glasgow and London.

The great merit of their plan of ventilation consists in its simplicity; there are no movable parts in the ventilator, which is entirely self-acting. Dr. B. W. Richardson, in his lecture on the health of great cities, delivered in the City Hall, Glasgow, referred in the highest terms to Boyle's air-pump ventilators, saying, "Since these ventilators have been introduced we have got perfect methods of ventilation." These ventilators are made in such a form that they can be used in connection with any style of architecture.—*British Mail.*

Brighton (Eng) Water Works.

WATER PRESSURE.

The water at Warren Farm is 279 feet above the reservoir at Islingward road, and the power requisite to force the water up to Warren Farm is obtained by the 70 foot fall from Park road to Islingward road, so that the net elevation forced against is 209 feet to Warren Farm and 169 to Race-hill.

The only motive power is the water, which is afterward used by the inhabitants living on the lower level, the work being done with no other cost than that of maintenance of the engine. It is entirely automatic in its action, and, having no dead centre,

stops and starts without requiring attendant to be near it. In the event of there being a sufficient quantity of water in either of the upper reservoirs, the supply to that ceases, and if both are full, the engine remains motionless until more water is required.

The engine delivers from 50,000 to 60,000 gallons of water per day into either or both of the upper reservoirs. The pump is double-acting, has a brass lining, gun-metal piston rings, valves, and seatings. The motor has a gun-metal cylinder, in which works a 12-inch gun-metal piston packed with cup leathers. The slide valves with their faces, as well as the valve piston and cylinder, are all either of gun-metal or lined with it. Bailey's ganges for indicating pressure are affixed to inlet of motor and outlet of pump. The indicator on the motor cylinber records the number of strokes, and thus approximately the amount of water delivered can be read off. The piston-rod, crosshead,, levers, links, and all the working parts are of steel, electro-plated except on their working faces.—*Builder.*

On the Determination of Sulphur in Coal.

Nakamura, a student in the Engineering College in Tokio, has devised a new process of determining sulphur in a coal, which seems to work well. It consists in heating the coal below a red heat in contact with alkaline carbonates, by which the coal, whether bituminous or not, rapidly undergoes, without evolution of smoke, complete atmospheric oxidation in a manner hardly to have been expected. To one part of coal in very fine powder take three or four parts of the mixed alkali-carbonates. Mix intimately in a platinum dish and heat at first gently, using alcohol in place of gas to avoid the sulphur of the latter. Raise the heat very slowly, not reaching a visible red until the surface of the mass becomes faintly gray. Then heat to a faint red, and keep it there for an hour, when the mass will be nearly or quite white. It is then treated with water, filtered, and the sulphuric acid determined in the filtrate as usual. The complete combustion of coal and coke at so low a temperature is noticeable. The carbonate seems to exert no chemical action in the case, but acts mechanically, apparently the spaces between the particles allowing a draft of air, and the combustion proceeding from the bottom toward the top. Direct experiment shows no loss of sulphur, and comparative tests prove the results to be accurate. The complete roasting process occupies about an hour and a half.—*J. Chem. Soc.*, xxxv, 785, Dec., 1879.

Artificial Lighting of Railway Carriages.

The link which connects a whole chain of inventions is not always perceptible, and the relationship between the Westinghouse break and the artificial lighting of railway carriages may not at first sight be very apparent. It is proposed, however, and we will not be greatly astonished if, ere long, all trains fitted with this powerful break are at the same time lighted up by means of brilliant gas. The Westinghouse break, it may be generally known, requires a constant supply of compressed air, worked from the driving engine, to keep the breaks off the wheels, and when the continuity of the current is interrupted, the breaks immediately come into action. The idea which has now occurred is to utilize a portion of that air for lighting purposes, and this is effected by forcing it through a chamber charged with some volatile hydrocarbon, and then conveying it to the point of ignition. Experiments with the process are at present being conducted on the Glasgow and Helensburgh line, and they are said to be very satisfactory. It will be seen that when the train is not in motion there is no necessity for keeping up the supply of air from the engine, but, by an ingenious device, the supply of gas is maintained, although a stoppage of twenty minutes should take place. We trust that the inventor will be able to perfect his apparatus, and that railway companies will see it to be to their interest to apply the system, as a well-lighted carriage greatly conduces to the comfort of travelers.—*Jour. Artificial Light.*

Gas Stocks.

Quotations by G. W. Close Jr., Broker and Dealer in Gas Stocks.
(with W B Scott & Co.,)

34 Pine Street, New York City.

June 2, 1880.

☞ All communciations will receive particular attention ☜ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid.	Asked.
Gas Co.'s of N. Y. City.				
Central	466,000	50	60	70
Harlem	1,800,000	50	70	75
" Bonds	170,000			103
Manhattan	4,000,000	50	200	205x
Metropolitan	2,500,000	100	138	145x
" Scrip	$1,000,000	...	100	103x
Mutual	5,000,000	100	78	82
" Bonds, go'd.	900,000	1000	100	—
Municipal	1,500,000	100	150	160
" Bonds	750,000		106	110
New York	4,000,000	100	102	105
Northern	270,000	50	—	100
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	125	130x
Citizens	1,200,000	20	67	72
" S. F. Bonds.	320,000	1000	100	105
Fulton Municipal	1,500,000	100	95	100
Peoples	1,000,000	10	35	40
" Bonds	290,000	...	90	95
" Scrip	250,000	...	75	85
Metropolitan	1,000,000	100	60	70
Nassau	1,000,000	25	53	60
" Ctfs.	700,000	1000	85	95
Williamsburgh	1,000,000	50	68	73
" Scrip		...	98	103
Kings Co	135,000	100	60	70
" Bonds	40,000	—	—	—
Union Co. E. N. Y.		25	—	50
Richmond Co., S. I.	300,000	...	75	80
Out of Town Gas Companies.				
Bath, Maine	70,000	100		
Buffalo Mutual, N.Y	750,000	100	65	70
" Bonds	200,000	1000	95	100
Baltimore, Md	2,000,000	100	185	190
" Ctfs., gold	1,000,000		—	103
Bayonne, N. J.		100		90
Brockport, N. Y.	25,000	100	...	80
Citizens, Newark	918,000	50	85	90
" " " Bds.	124,000	—	105	10
Chicago Gas Co., Ills			125	—
Cincinnati G. & C. Co.				190
Derby of Conn	160,000	100	60	80
East Boston, Mass		25	114	120
Elizabethtown, N. J.	300,000	20	—	130
Fort Wayne, Ind.		100	...	—
Hannibal, Mo	100,000	100	95	100
Hartford, Conn	700,000	25	120	125
Hempstead, L. I.	25,000	100	...	—
Halifax N. S.	400,000	40	148	150
Hamilton, Ontario	150,000	40	117½	
Jersey City	750,000	20	155	160
Jamaica, L. I.	25,000	100	...	—
Jacksonville, Ill.	120,000	50	100	...
Lewistown Maine	400,000	100	70	80
Laclede St Louis Mo.	1,200,000	100	93	96
Long Branch		20	30	40
New Haven, Conn		25	120	140
Peoples, Jersey City		...	50	60
" " Bds.				5
Peoples of Baltimore		25	100	102
" Bonds			106	—
Plainfield, N. J.	80,000	100	—	105
Perth Amboy		25	—	95
Pittsfield, Mass			120	130
Rochester, N. Y.		50	70	80

The Metropolitan, of New York city, has declared an extra dividend of 5% on stock, and 3½% on scrip; Manhattan declared one of 8%; Brooklyn has declared a dividend of 5%. The above dividends are payable on demand at the offices of the companies.

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PROPOSALS.

THE PRESENT CONTRACT OF LIGHTING THE CITY OF GUAYAQUIL BEING ABOUT TO CONCLUDE IN MARCH, 1881, THE TOWN COUNCIL

SOLICITS OFFERS FOR

Lighting said City with Gas

OR ANY BETTER ARTICLE.

The contractor may calculate on 600 lights as a basis, more or less. The proposals must be addressed to MR. GREGORIO DE YCAZA, President of the Town Council of Guayaquil, Ecuador, and will be received not later than July 31st next.

GUAYAQUIL, March 29, 1880.

PEDRO J. NOBOA, Secretary.

For further particulars, apply to R. and C. DEGENER, 50 Wall Street, New York City. P. O. Box 4279. 501-4t

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Office GAS LT. JOURNAL

"How to Burn Gas."

Under this title a neat little book has been issued containing the paper of Mr. Jas. Somerville, as read at the last meeting at Cincinnati, together with a table, taken from Prof. Chandler's lecture, showing the loss of light resulting from the use of shades, etc., of different kinds of glass.

The book is intended for sale to Gas Companies to distribute gratuitously among consumers. If Gas Companies can induce their consumers to use better burners and shades, one-half of the fault-finding will cease.

The price is $10 per thousand. Orders may be sent to the office of this Journal.

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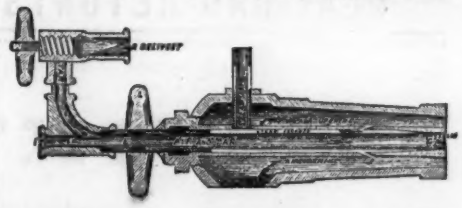

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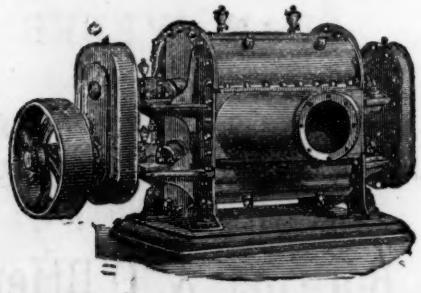

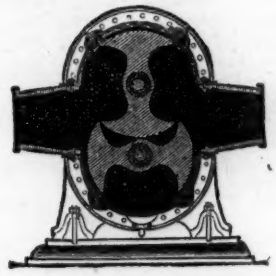

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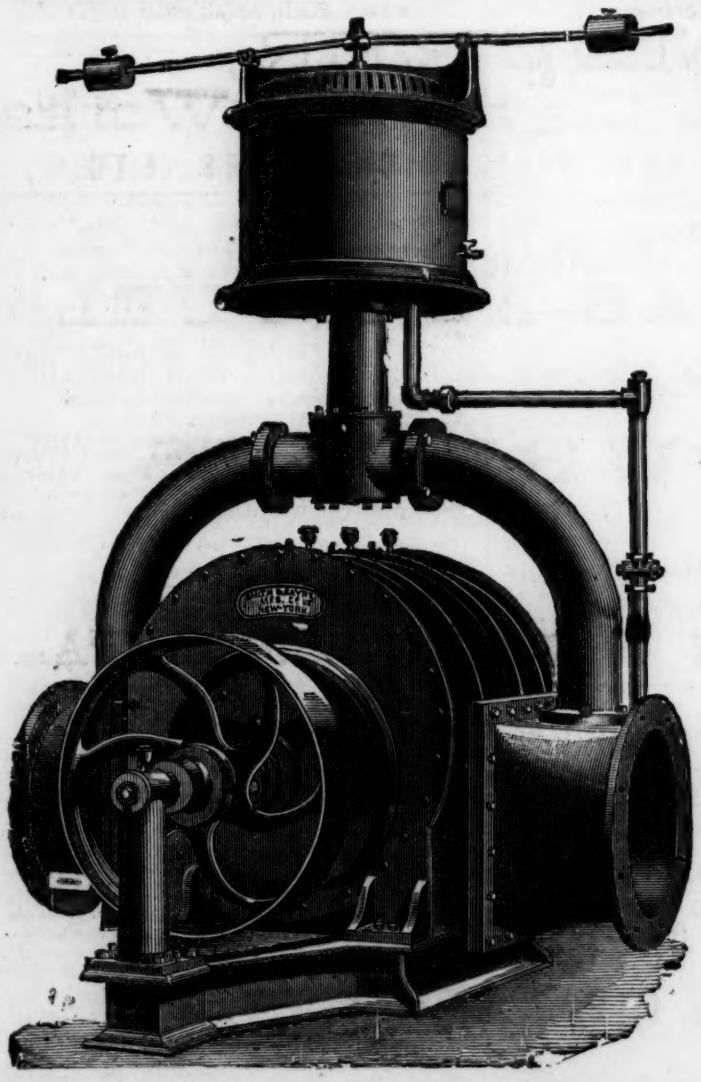

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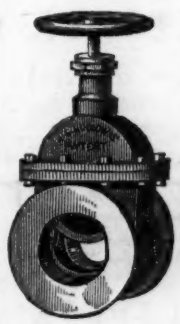

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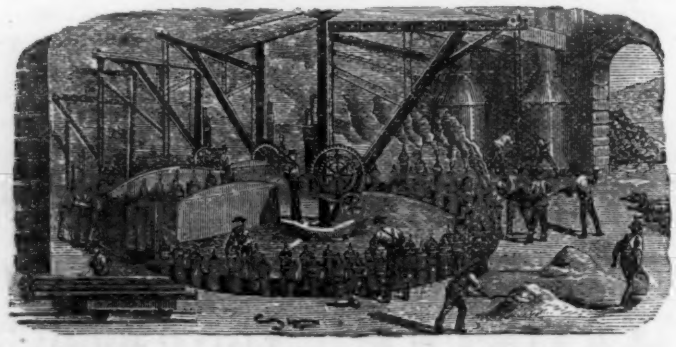

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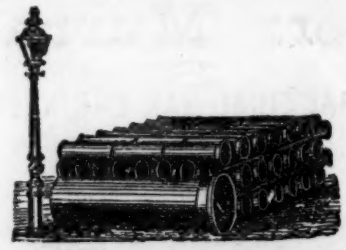

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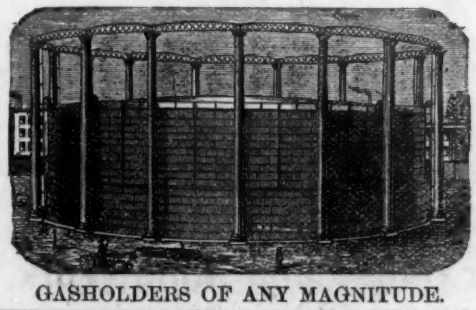

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THE AMERICAN GAS-LIGHT JOURNAL.

$3 PER ANNUM.

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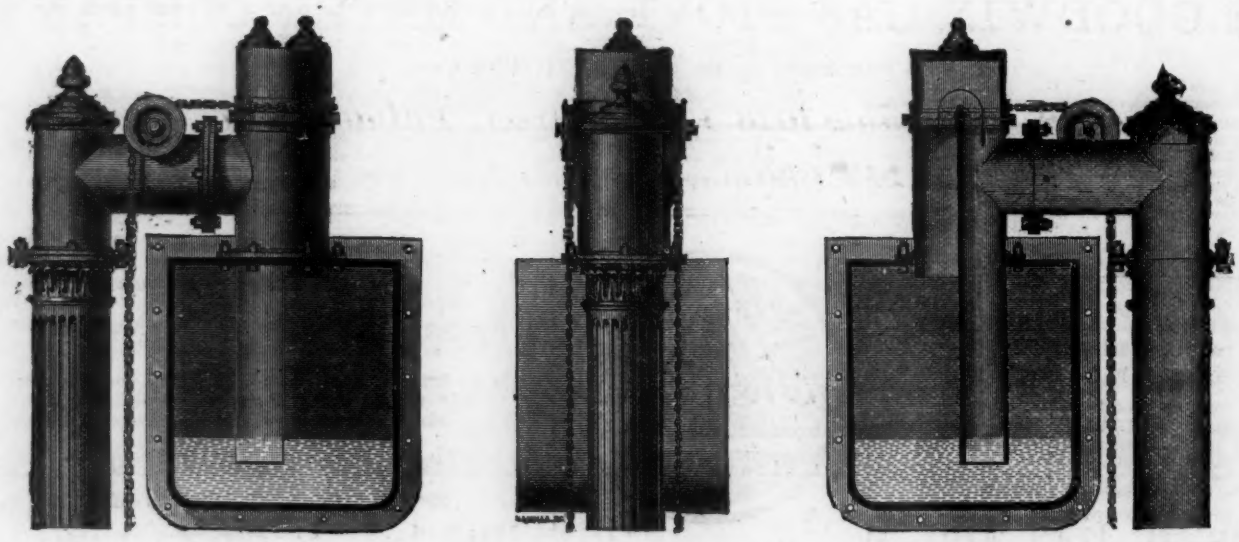

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